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AUTOMOTIVE INDUSTRIES

AUTOMOTIVE INDUSTRIES

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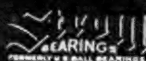
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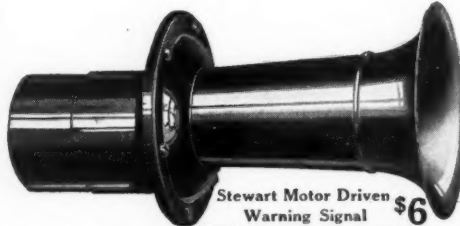
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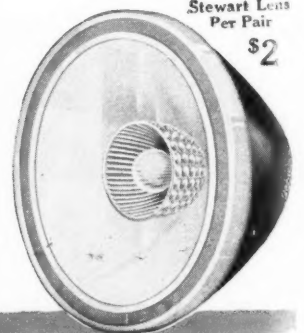


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AUTOMOTIVE INDUSTRIES

The AUTOMOBILE

VOL. XXXIX

NEW YORK, THURSDAY, NOVEMBER 7, 1918—CHICAGO

No. 19

Liberty Engine Profits Not Excessive

In Contrast to Original "Bogey," Subsequently Reduced, and Costs of Similar Types to Our Allies, They Are Reasonable—Bare Statements of Hughes Report Create Misunderstandings—Charges Against Deeds and Vincent Considered Minor Compared With Allegations Investigated

WASHINGTON, Nov. 5—That the former aircraft authorities and the automobile makers manufacturing airplane engines have been completely vindicated, and that this exoneration forms the important result of the Hughes airplane report is the opinion here following a week's digest of the statement.

As regards the less important findings, there are many varied views. Failure to recall the serious charges of wholesale graft and waste which instigated the Hughes investigation has led many to regard the disclosures in the report critically and to demand prompt action by the authorities.

They do not contrast the minor violations uncovered with the extravagant accusations which were shown to be untrue. Others are of the opinion that Mr. Hughes "went gunning for an elephant and came home with a squirrel."

This opinion is based upon the fact that Mr. Hughes started out to investigate charges of widespread dishonesty and possible theft of hundreds of millions, and only discovered less important wrongs which form the substance of his statement. However, the report which is an accurate statement and the result of a highly trained legal mind limited by the boundaries of law, would not have been complete had it not dwelt as thoroughly on the less important details also. Both those who believe that the report discloses most serious evils and those who

criticise it because it apparently dwells upon less important wrongs, fail perhaps to consider that the very absence of sensation, without intent magnifies the minor violations.

Perhaps the chief criticism of the report may be directed to its lack of explanations and comparisons without which some of the bare statements tend to create misunderstanding of the situation. This is particularly true in the case of the Liberty engine contracts.

In discussion of the profits made by the Liberty engine manufacturers Mr. Hughes told that the original bogey price was \$6087 and this was reduced in December, 1917, to \$5000 with the fixed profit at 12½ per cent. or \$625 per engine. This contract has again been changed recently and put upon a fixed-price basis of \$4000 per engine.

The engines are being manufactured by a number of companies, including Packard, Lincoln and Ford, says the report, at costs of from \$3200 to \$3583 with the result that under the \$5000 bogey, manufacturers made profits up to \$1100 per engine while on the \$4000 fixed-price, profits will range up to possibly \$1000 per engine on the total contract outputs.

This profit Mr. Hughes calls "very liberal." The tenor of his statement is that an excessive profit has probably been made heretofore, and it is here that his bare statement of facts without explanation

and comparison is likely to lead the public to the impression that automobile makers producing Liberty engines are guilty of profiteering.

That this is not the case is easily understood when, first, consideration is given to the fact, that the European nations are paying \$11,000 per engine for types similar to the Liberty though not as powerful, and secondly that the original bogey price set on Liberty engines, in view of European costs, was exceedingly low and perhaps more of a "gamble" for the manufacturers than for the Government.

The proof that the makers were not profiteering and were as anxious to reduce the figures as is the Government has been shown in their constant efforts to lower the production cost and their prompt collaboration with the authorities in the revision of contracts as warranted.

First Cost Was Unknown

With the first work on engine production the cost, due to the fact that the industry was new and that the work was entirely experimental, was a completely unknown quantity. The automobile industry invested \$35,000,000. The first engines turned out at \$5000 netted some manufacturers but 5 per cent. on their investments. As production went ahead, however, the cost decreased. The personnel became more skilled. Production routing improved. And consequently the figures on the Liberty engine cost could be and were revised.

Therefore, although the profits made on the first engines, and the profits which would have been made on the \$5000 bogey contract on which possibilities Mr. Hughes dwelt at length, may have appeared excessive, in consideration of the risks undertaken by the manufacturers and the cost of European engines, they were reasonable.

60% of Profits to Government

Further, as stated by Attorney General Gregory in his comment on the contractors' profits, while "they appear to be unusually liberal, when it is remembered that 60 per cent. or more of them must be paid to the Government as income and excess profits taxes, and that most of the net profits will be invested in buildings and facilities which may or may not be capable of profitable use for an indefinite period after the termination of the contract, no such profits have been allowed as to justify a charge of bad faith."

The charges against Col. E. A. Deeds and Lt. Col. J. G. Vincent have aroused some resentment in the minds of those who believed that the violations and improper conduct of these men were minor in comparison to the charges Mr. Hughes sifted.

Recommendations Considered Severe

It is pointed out that the report itself found no evidence of fraud or intent to defraud in the case of Vincent and in consequence it is thought that the recommendation for criminal prosecution against him is severe, particularly in consideration of the valuable services he has given the Government.

The charges against Col. Vincent are insignificant and purely technical. At the outbreak of the war

the Government had no factories of its own for speedy production of Liberty engines and the Packard company, equipped for immediate output, had pushed production regardless of the technicality of the law prohibiting any person interested in a corporation dealing with the Government from acting as an agent of the Government in business transactions with that concern.

Shortly after the Liberty engine was adopted as the standard aircraft engine, Col. Vincent resigned as vice-president of the Packard Motor Car Co., to accept the position of chief engineer in the production of the engine. The Liberty engine having been created there was no Government organization to expedite production. Nevertheless a complete engine was built within a month from the time the Packard company received instructions from the Government to proceed. This work was executed by an organization prepared and trained by Col. Vincent, that is the Packard experimental department which it is probable was the best equipped plant for this work in the whole United States. The accomplishment of results was put ahead of the technical correctness of the method. The sole charge is a technical one.

Ford Defends Alien Enemies

Henry Ford who was criticised for his failure to remove employees who were German born and who were at work upon Liberty engines replied to the charges in a statement saying:

"The Ford Motor Co. has manufactured 1242 Liberty engines during the past month. That was about 300 more than were manufactured by the next highest factory. I do not know what better answer could be made to all the criticisms. We started later than others and have passed all, the production standing up to the most rigid inspection in every particular.

"Our policy is to make men, not to break men. In times of panic great injury and injustice are often done to innocent persons and we try to keep our heads. We would not allow injustice to be done to an old, trusted and valued employee even though he was born in Germany. The results speak for themselves.

Claims German Was Efficient

"Mr. Embie referred to as the special example in the report has been with us over 12 years and he is a most able and excellent engineer and has always given perfect satisfaction. Not one word of fault could be found by Mr. Hughes or any one else with regard to Mr. Embie's actual work. We in the plant know he gave valuable systems and many suggestions for the development of the Liberty engine cylinders which are being furnished to all manufacturers at a saving of \$345,000 a month to the Government over former prices."

The criticism against Brig. Gen. George O. Squier that the construction of an adequate organization for aircraft production was beyond his competency, is taken here by many as a direct reflection upon the War Department. It is understood to imply that the War Department did not grasp the magnitude of

the task and that in leaving the huge aircraft programs in the hands of the Signal Corps it failed to realize the special features of this program and technique and skill involved.

Some comment is made that the report does not dwell sufficiently upon Howard E. Coffin but considering that Mr. Hughes failed to find Mr. Coffin guilty of wrong acts and that his position was purely advisory, which findings exonerate Mr. Coffin from all the charges made against him last spring, little more could be expected.

The difficulties under which Mr. Coffin worked and by which he was hampered are clearly reflected in that part of the report which dwells upon the inefficiency of Gen. Squier's office. Recommendations by the Aircraft Production Board, which was headed by Coffin, went for naught. Attempts to have production on the Caproni and other planes started were thwarted time and again. Most of the other recommendations were likewise tabled or delayed.

Great Credit Due Old Board

Perhaps the best proof of the worth of the original aircraft board was shown recently in a statement by the present authorities to the effect that great credit was due that board and that the present aircraft successes are solely the result of the continuation of the principles and program laid down originally.

The charges that unfair contracts for the Government were entered into are shown by both Mr. Hughes and Attorney General Gregory to be incorrect. No contracts providing for a fixed percentage of profit on production cost were made.

It will be recalled that the earlier charges maintained that contracts had been made by which manufacturers were to receive a certain percentage of the cost for their profits.

Under such contracts, it was said, the higher the cost, the greater the profit, and, consequently, it would be to the interest of the manufacturer to increase the cost rather than lower it. As Attorney General Gregory stated "no such contracts have been made."

The forms of contracts entered into have all been on the cost-plus basis, the only forms of contracts which would be sufficiently flexible to operate satisfactorily and which could be made in view of the unforeseen and uncontrollable changes in the prices of material and labor.

The contracts that were made under the cost-plus arrangement are shown by the Attorney-General to insure a gradual decrease of cost to the Government by the provision that the contractor would share in the saving if the actual cost were less than the estimated cost or bogey, in the contract. Furthermore the contracts that were made contained a clause reserving to the Government the right to terminate them or revise them at any time by repaying the amounts expended plus the fixed profits on finished articles and 10 per cent of the labor and materials costs on unfinished work.

Thus, the sensational charges of last spring, made by a man who used a personal letter from the President, as the credential for investigations taken up by members of Congress, in some instances possibly for political reasons, and later developed to such a degree that they were serious reflections upon the automobile industry, have come to naught.

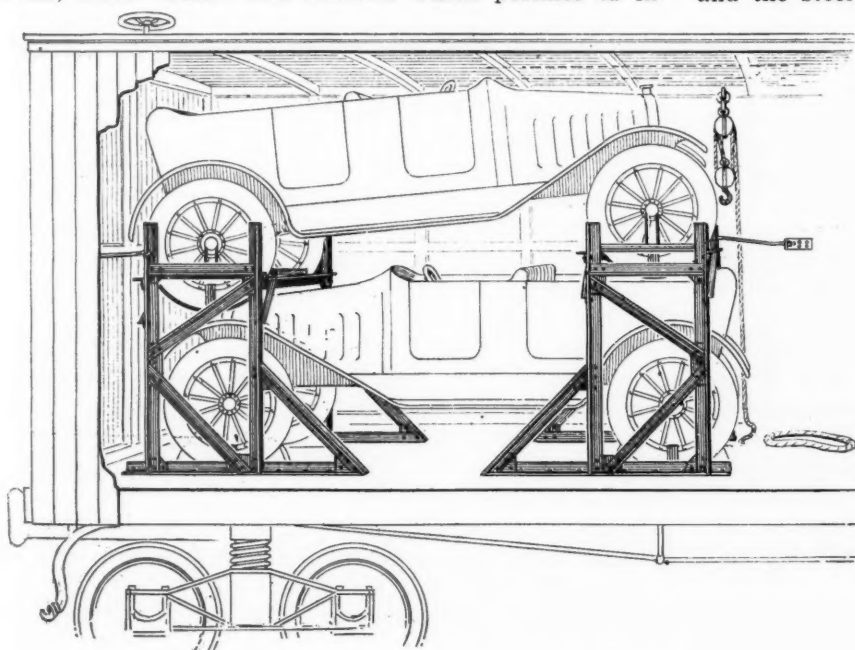
Carbo Steel Deck for Loading Automobiles

THE Carbo Steel Post Co., Chicago Heights, Ill., has devised a deck for loading freight cars with automobiles, motor trucks and tractors which permits of in-

creasing the capacity of a box car from 60 to 70 per cent over single-deck loading. One car is placed on the floor, and the steel deck is placed over it, another car being placed on the deck, reversed end for end with respect to the first one. The method of loading by means of these decks can be used on flat cars as well as in box cars, and will then increase the capacity 100 per cent. These steel decks are said to be lighter than wood decking, and thus to save freight.

In loading cars with the aid of the Carbo deck the wheels need not be taken off the top cars, and generally the tires are even left on. As the cars straddle each other, the height of the two cars combined will be 18 to 24 in. lower than with other methods of loading. It will be seen from the illustration that the two cars are reversed end for end.

These decks are also used by automobile dealers and warehouses for storage purposes, and they are claimed to be preferable to pits for repair work. The decks are standardized for various loads and purposes, and they are either leased or sold outright.



Agreement vs. Bargaining

Trust or Confidence Between Employer and Employee Impossible So Long As Both Frankly Base Their Relations Upon Their Ability To Take Advantage of a Bargain

By Harry Tipper

ALMOST all the strikes which have taken place in the various countries at war have been distinguished by the decision of a body of workers to strike in the face of instructions to the contrary from their national union, and the fact that they have frequently broken a contract made by the same body at an earlier time.

Not long ago there was a strike of press feeders in Chicago. This strike was repudiated by the National Union. The employing printers had an organization and agreed to allow the men to strike rather than meet the demands.

The men struck, and after a few days some of the employing printers deserted their organization, with whom they had agreed to stand out against the men, and met the demands in order to go ahead with their business.

As this is being written there is a strike of press feeders in New York, despite the fact that it is not countenanced by the National body, and despite the fact that there is an agreement with the employers which should run till next spring.

Whenever a group of manufacturers gets together and talks about the labor question there are two matters which always come in for a good deal of attention—the uncertain character of an agreement with a union and the weakness of some members of the manufacturers' group.

The fact is local interests and necessities are paramount with both sides. Just so long as there is no reason for breaking away from an agreement the general action of the group stands, but so soon as the local situation presents either advantage or apparent necessity for special action that local condition will govern, general agreements to the contrary notwithstanding.

The present conflict has witnessed more of this independent action of local labor unions and manufacturers' groups, because the local conditions of the labor market in a time of such scarcity give the worker much advantage in a bargain, and the local conditions of business with so large a governmental necessity influence the attitude of the

local manufacturers' body upon the same matters.

Since wages ceased to be the subject of legislation and became the private concern of the parties at interest, the amount of such wages has been a matter of trade. When the labor market was overstocked with available labor, the manufacturer has always used that to keep down the price and when the market has been unable to supply the demand the worker has always seized upon his advantage to increase the price of his work.

Both sides have had a good deal to say about their rights and how just and fair they were in their attitude toward the matter, but the history of the continual disputes and the condition of wages shows

clearly that wages have always been based upon the horse-trading principle—each side gets as much as it can from the other, according to the prevailing conditions.

Under such a system of payment there is no relation between the value of a piece of work and the amount which may be paid for it. Because they are in a better position to drive a bargain, the strongly organized branches are constantly improving their working conditions, while those who are less well organized are constantly losing ground.

Thus workers in some of the metal and mining trades have been able to strengthen their position so thoroughly that during this war they have reached \$5,000, \$10,000 and even a larger scale of yearly earning capacity, while the supervisors who must govern these workers have not increased appreciably.

I know many men who must govern large business affairs and accept important responsibility whose earnings are less in commodity value than they were before the war broke out, while their employees are able to indulge in luxury to an unheard-of amount.

Workers whose job requires so little judgment or skill that they can become expert in six weeks are making \$50, \$60 and \$100 per week, while a vast army of clerks, accountants and minor executives in business who have spent many years in a

“WHERE the majority vote is necessary to ratify an agreement, the majority vote can, of course, rescind such an agreement and, while between individuals a contract must involve a *quid pro quo*, it has been found impossible as yet to enforce the same principle in contracts between organized masses, so that these contracts are practically nothing more than expressions of opinion between the majorities which it is hoped will last the length of the agreed time.”—*The New Business*.

slow growth in the required training of their specialization are not nearly so well off from an earning standpoint as they were before the war.

In the days of hand labor the craftsman was paid according to the length of apprenticeship required for his training and for his extra skill at his work when the training was over.

The present methods of deciding wages and of readjusting them cannot be justified upon any consideration of equity and can be of value only if industry is to continue to run its business upon the basis of horse-trading, with its concomitant discontent, compromise and readjustment.

There are some manufacturers who have stated to the writer that they expected to continue their business upon those lines and to be able to secure a dominant position again after the war is over. One of them stated the case in these words:

"We are accepting these conditions now because we are in business to win the war and we will go out of business if necessary to do that; but you wait till the war is over and we get back on commercial business. There will be plenty of labor then and we will get back to our old basis."

It is not necessary to discuss the absurdity of this viewpoint, but it is necessary to point out that the worker is much more powerful than he has ever been before; not merely because of scarcity of labor, but because of the growing solidarity of his organizations and class consciousness, because of his numerical power as a voter in the political government of the country and his influence upon governmental outlook and action.

Politics Based Upon Industrial Demands

The political demands of the Labor Party of Great Britain are mostly industrial demands turned into the political arena. The action of government upon industrial matters in this country has been visibly influenced by the importance of labor as a voting power. These things make it certain that a continuance of the old system of bargaining in the spirit of a horse-trade will have the result of placing the manufacturer in a poorer position to trade at each necessity for decision.

It will make it impossible to depend upon agreements between unions and manufacturers' groups and it will hasten the entry of industrial questions into the arena of political action.

For these reasons it is necessary for the manufacturer to study the wage system with a care that he has not given it heretofore. It will be necessary for him to approach the matter with some idea of finding out if there is a just way of computing the value of different classes of work and if it is possible to come to agreements with his employees instead of continually bargaining with them. It is this system which is at the bottom of the want of confidence between the employer and the employee.

There can be no trust or confidence between parties who are frankly basing their relations upon the ability to take advantage of a bargain and to put into the bargain every advantage which conditions may open up.

No agreement will ever make the workers of a locality or a factory lose a bargain when the advantage of bargaining is on their side, and it is evident from the record of strikes during the past four years that the attitude of the national body of workers will not be permitted to prevent the workers of that locality or establishment from getting theirs if there seems to be a good opportunity to do it.

No agreement with other manufacturers will keep the individual manufacturer so thoroughly tied up that he will not kick over the traces when there is an opportunity to get the best of the bargain with his local labor by breaking it, or get the advantage of his competitor by the same method.

There is little or no chance for the co-operative spirit in a manufacturing establishment, no matter what bonus, profit-sharing, welfare and other advantages may be offered, so long as all the workers in that establishment know that the wages and salaries are arranged as a matter of trade, and they are therefore only to be rearranged when the employee has some bargaining advantage.

Unjust Wage System Causes Distrust

It is the lack of justice in the method of operating the wage system which is responsible for the unbelief in the employer on the part of the employee. It is not that the wages are necessarily small, but the continual bargaining individually and collectively results in such rank injustices that there are always many employees who feel that they have not been treated fairly because they were not good at bargaining, and there are just sufficient evidences at all times that this or that body of workers has been able to put it over to induce the other unions to try.

The most intelligent, alert workers are frequently the poorest bargainers and the radicals among labor leaders number quite a few of these.

It has been well said in advertising that the firm that wants to advertise and stay in business must tell the truth about itself and give just service. It is sure that if the good will of the buyer of goods can be permanently maintained only by telling the truth and giving just service, the good-will of the employee is not to be more easily secured.

This is a problem so important in its difficulties and so necessary in its solution that it could well be the topic of discussion between employer and employee sitting around the council table of the industrial organization.

Industrials and the Reconstruction Period

IN England, as in other countries, the thought of industrials at this time is turning toward the period of reconstruction, and serious efforts are evidently to be made by British automobile manufacturers to secure tariff protection when the sale of automobiles will again be permitted. *The Autocar* quotes the Prime Minister to the effect that "the key industries must be allowed to reconstruct themselves while they have still behind them the spirit of patriotism and sacrifice which has been aroused by the war and of the spirit of fraternity which makes rich and poor one great people."

Types of Tractors Recently Exhibited in France

*Plowing with De Dion-Bouton cable-winding machine**Doisy machine with winding drum**Paris General Omnibus Co. tractor**Tractor exhibited by the French Schneider company, showing front and rear views*

Tractor Development in France

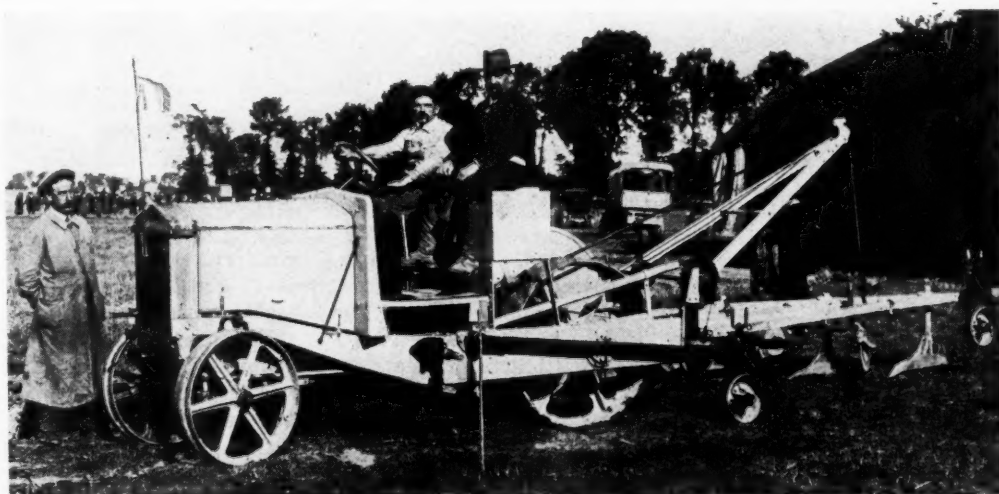
Scarcity of Horses and Agricultural Labor Compels Use of Tractors—Various French, Italian and American Types Shown at Demonstration Conducted by National Tractor Association

By W. F. Bradley

PROOF of the importance which is attached in France to the farm tractor is to be found in the formation of a syndicate of tractor manufacturers and dealers in the decision to hold public demonstrations twice a year, in the spring and fall.

The first of the syndicate's demonstrations took place recently in the neighborhood of Paris, under the direct patronage of all the Government departments, and proved to be the biggest and most important event of its kind held in France. The situation at the present time is full of difficulties. Owing to the fact that the agricultural classes have furnished the greatest proportion of fighting men—for the mechanical classes have mostly been mobilized in the factories—land is going out of cultivation and each succeeding year shows a lower output of wheat. This condition will not be completely remedied with the end of the war, for the losses among agricultural workers have been so heavy that there will be a shortage of labor on the land for years to come. This fact is fully recognized by the various authorities, who are doing everything possible to increase the number of tractors in use.

The education of farmers to the use of tractors is the



Tourand-Latil tractor recently exhibited in France under Government auspices

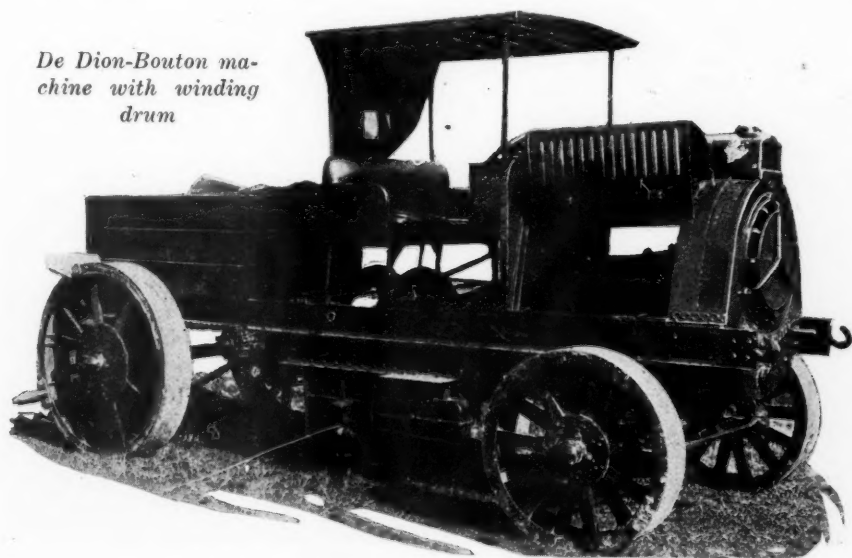
lesser of the two problems. Eight years of demonstrations in various parts of the country have convinced the farmers that the land can be worked better by tractors than by horses. If they did not make the change it was more by reason of inertia than because of lack of conviction. Now that 2,000,000 farmers are in the army and horses are reduced in number so much that they have to be loaned from farm to farm, the only problem is how to get delivery of tractors.

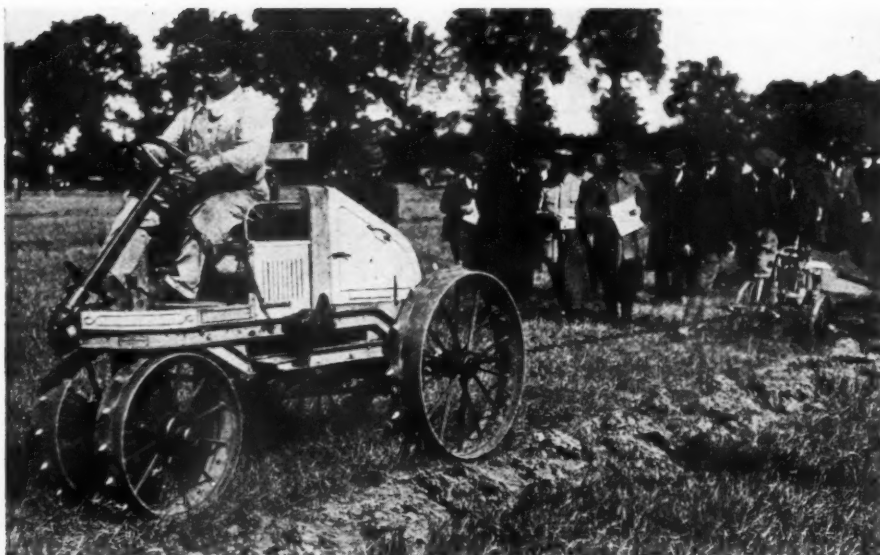
Importers and French manufacturers are on an equal footing. The former cannot get shipping space and the latter are limited in their output by reason of the shortage of material. One firm alone, with an output of 5 four-wheel drive heavy artillery tractors a day, states that it is 200 agricultural tractors behind on deliveries. Other factories are in the same position. Although they possess manufacturing facilities they are held back on agricultural tractors by reason of the more urgent call for war material.

Such importers as Case, International Harvester, Cleveland, and Gaston, Williams & Wigmore have plenty of tractors, but they are all on the docks at New York. The French Ministry of Agriculture has taken the matter in hand and has purchased from the Case company, and shipped to France, more than 500 tractors, which are being either sold or rented to groups of French farmers. This is doing much to relieve the shortage, but the quantity is insufficient.

At the French demonstrations 13 French machines and 6 of American

De Dion-Bouton machine with winding drum





The Auror light tractor going through its paces at the recent French exhibition

origin were presented and demonstrated. The big automobile firms are interesting themselves in tractors. Among these are the De Dion-Bouton Co., the oldest automobile firm in France; the Latil Tractor Co., which is the largest artillery tractor concern in France; the Schneider Co., which has built most of the Paris omnibuses and is the largest maker of artillery in France; the Paris General Omnibus Co., which has taken up an English design. It is reported that the Panhard-Levassor Co. is interesting itself in an agricultural tractor. In Italy the Fiat Company, which claims to be the biggest of its kind in Europe, has already produced and marketed an agricultural tractor.

Three Groups of Tractors

The French tractors are divisible into three main groups, which in numerical order of importance are: cable towing machines; direct haulage tractors; self-contained tractors with rotary and other type plows.

De Dion-Bouton has settled in the cable towing class after having experimented with various kinds of machines during the last half dozen years. The machines it presented are a simple type of chassis with four cylinder motor under a hood and winding drum placed amidships. The chassis is not spring-suspended at the rear, and has only coil springs at the front. Two types were shown, one of these having side chain drive to the rear wheels, and the other the De Dion-Bouton system of internal gear. Naturally, with this system two tractors are required for one plow, a tractor being placed at each end of the field being plowed.

There is a modification of this system in the Doisy tractor, which has the motor forward under a hood, three-speed transmission, a jack-shaft with drive by side chains to the rear wheels, and from the jack-shaft another chain drive to a winding drum placed within the chassis and hav-

ing its shaft parallel with the rear axle. The jackshaft is fitted with dog clutches so that either pair of chains may receive the power; that is to say, the rear wheels or the winding drum may be driven independently off the same shaft. The distinctive feature of this tractor is its locking arrangement. The cable is not taken direct from the winding drum to the plow, but is carried round an idler pulley mounted on a shaft pivoted transversely under the center of the chassis. Attached under the shaft is a heavy steel plate fitted with a suitable system of spikes. The pull on the cable passing round the idler pulley draws the locking mechanism into the ground, and the greater the pull on the cable the greater the locking effort obtained. Only one tractor is used, and when the plow has been drawn across the field it

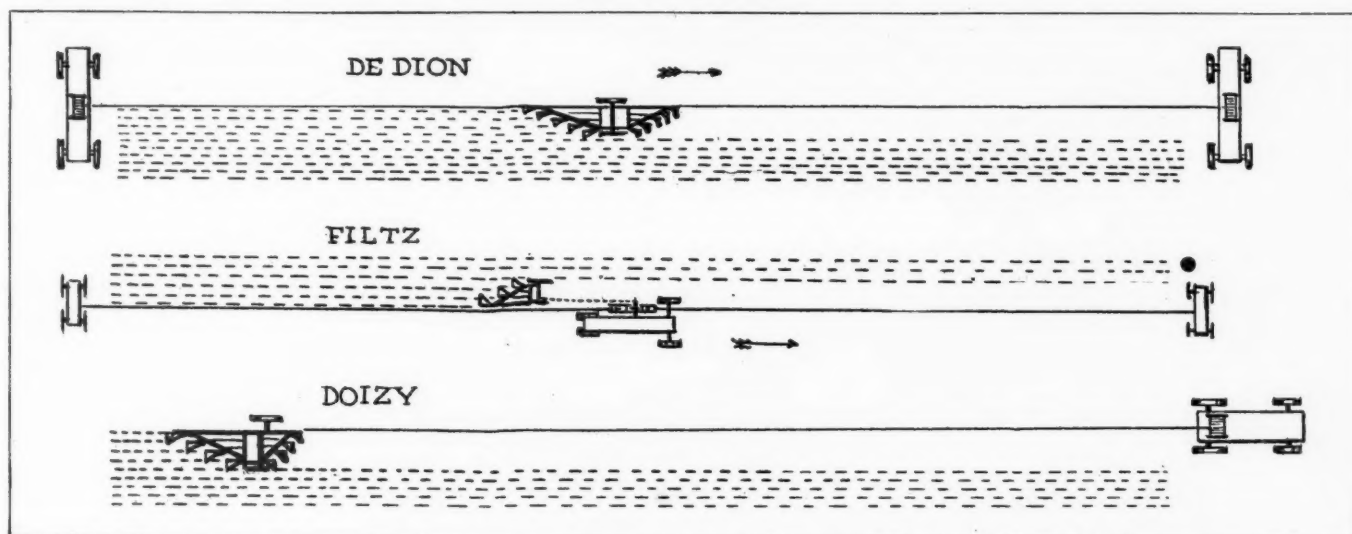
must run across to the opposite end, paying out its cable as it goes, and, after dropping its locking mechanism, begins winding operations again.

The next of the cable machines is the Filtz, which is again different from the other two. The Filtz, which was one of the first to be put on the French market, and was really well known before the war, is a light tractor with a plow connected up to it by a chain, and which hauls itself across the field by a cable which is anchored solidly at each end and passed around two winding drums mounted on the extremity of shafts just outside the frame members. There are two seats with a central steering column and wheel between them. On reaching the headlands the driver moves from one seat to the other and reverses the drive.

In the direct haulage class the most successful and best known machine is undoubtedly the Tourand-Latil. This tractor was designed some eight or nine years ago by Tourand, who demonstrated it and experimented with it on limited means until the beginning of the war, when it was adopted by the Latil Tractor Co. This firm has become the biggest four-wheel drive artillery tractor concern in France, with a huge modern factory and a yearly output of more than 2,000. The agricultural machine has profited by this association, for although



Operating Filtz agricultural tractor



Three systems of cable plowing demonstrated at French trials: De Dion-Bouton system with two tractors operating winding drums; Filtz system with a plow attached to it and hauling itself along the field by means of a fixed cable; Doizy system using a single tractor which moved from one side of the field to the other and hauled the plow by means of its winding drum

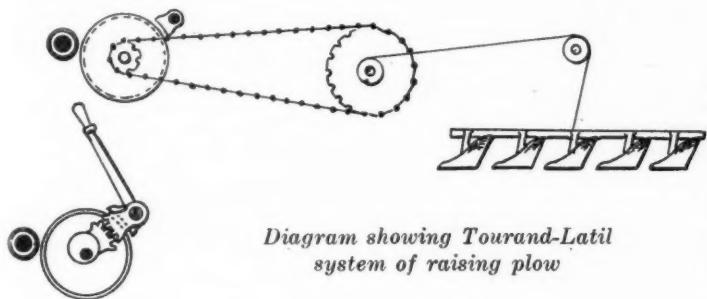


Diagram showing Tourand-Latil system of raising plow

the same in principle it has undergone many improvements in detail and in manufacturing methods.

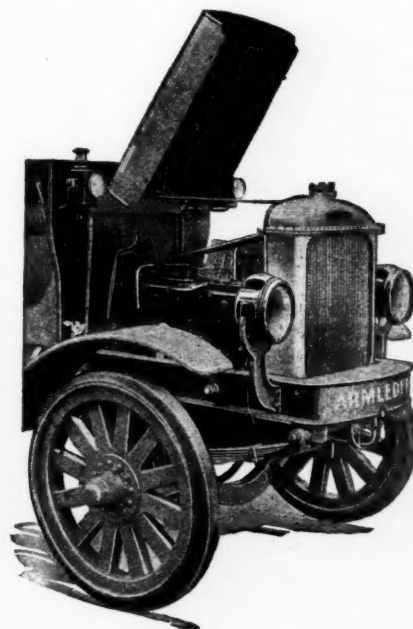
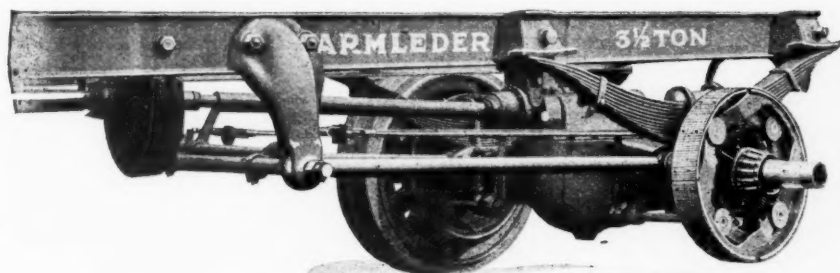
The motor is entirely new, being one of those used by the Latil company in the artillery tractors. The frame members have been redesigned so as to give a lower center of gravity and permit a better attachment of the plow to the tractor. This system of direct attachment of the plow to the tractor is one of the distinctive features of the Tourand-Latil. As will be seen from the illustrations, the plow is direct connected to the center of the frame, but pivoted at the rear, so that the entire plow can be raised or lowered by power in the shortest time, and is also adjusted for depth.

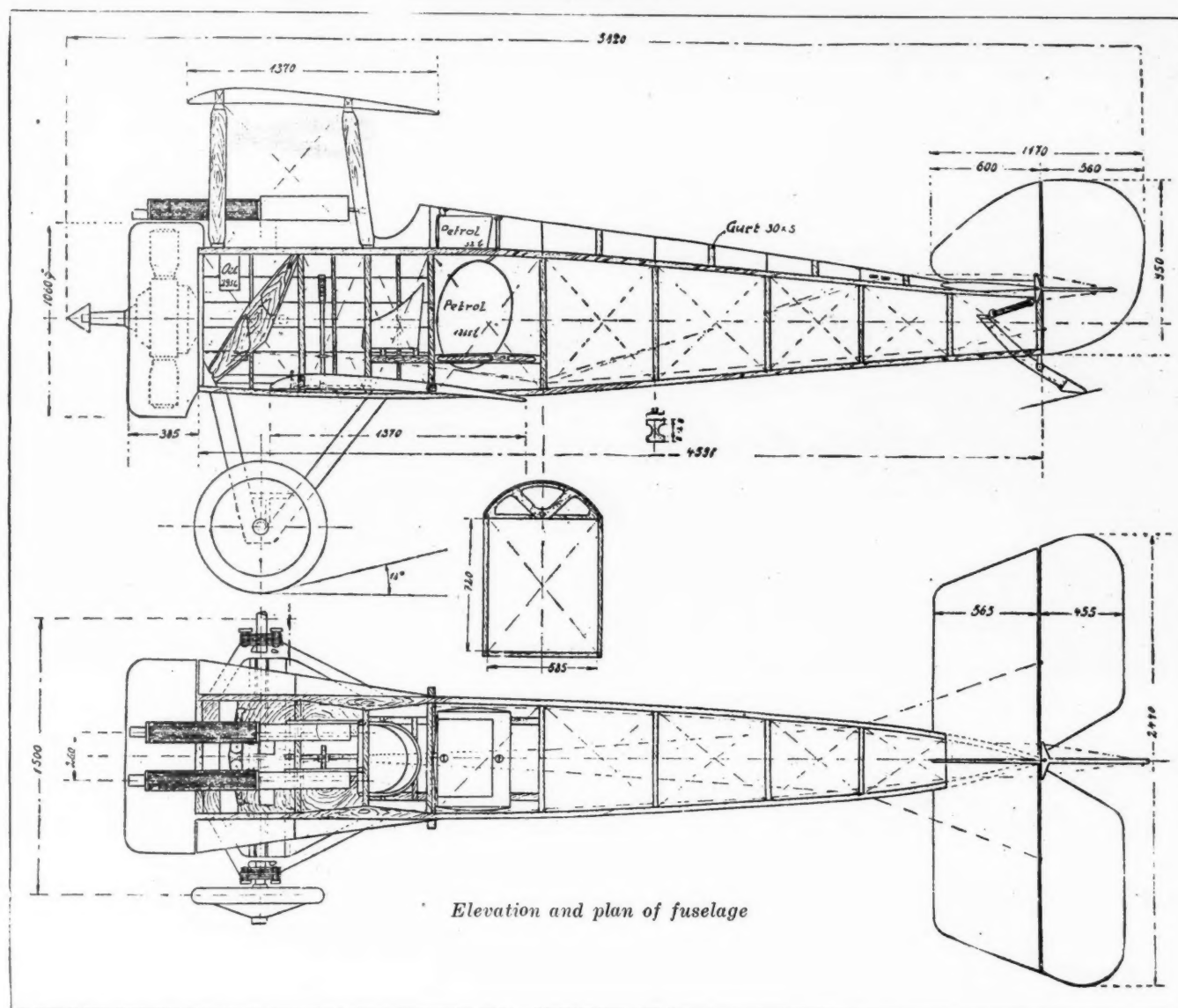
The only rotary plow in the trials was one presented by the S. O. M. U. A., this company being an auxiliary of the Schneider company. The machine, which is not new to the French public, is in the same general class as the Ford, so far as the absence of frame members is concerned. Here, however, the similarity ceases.

Novel Features in Armleder Truck

A NUMBER of novel features are found in the new truck models of the Armleder Co., Cincinnati, O. One of these consists in the arrangement of the radius rods. These extend between the spring saddles on the rear axle housing and drop brackets secured to the frame channels. These radius rods are fitted with ball and socket connections at both ends so that they are not subjected to stresses due to road inequalities. The rods are secured to the rear axle by means of the spring saddles, which are accurately machined to fit over the axle housing. The saddles are lipped and so clamped over the housing that the transmission of the driving thrust will not tend to displace the spring clips. All moving parts are bushed. The radius rods are parallel with the propeller shaft and of the same length. They are so placed in relation to the frame that when the truck is under load they are almost parallel to the ground.

The second new feature is the engine hood. Each side member of this hood is removable, the idea being to afford easy access to both sides of the engine. The upper part of the hood is hinged against the dash so that it can be raised from the front end and secured in the raised position to permit of such operations as valve grinding.





Elevation and plan of fuselage

levers are inside the body covering. Between them is a telescope sight. In a bomb rack under the body can be carried four bombs, the Bowden controls for which are placed to the left of the pilot. There is no bomb sight fitted to the body of the machine.

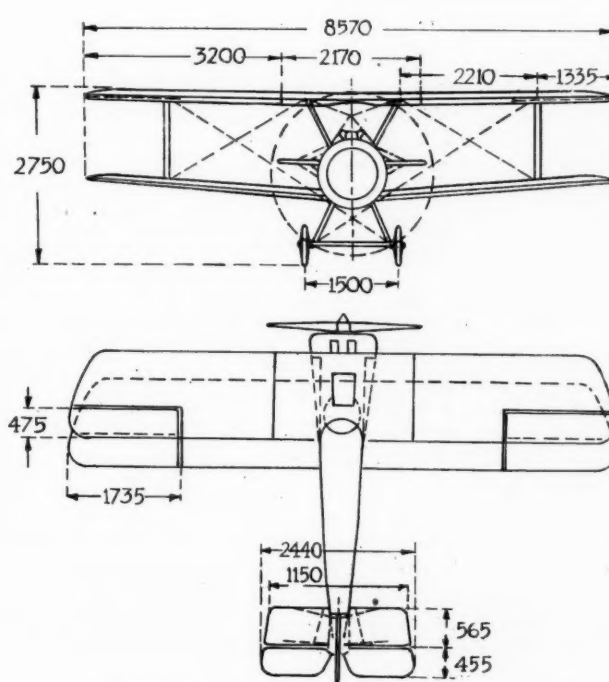
The weight of the machine empty was ascertained to be 430 kg. With tanks full the weight of the fuel is 150 kg. With pilot and armament the useful load would then amount to 290 kg. It is therefore to be assumed that the weight of about 50 kg. of bombs is only carried when the tanks are not full. Assuming a useful load of 290 kg. the total weight "all up" amounts to 720 kg. As the wing area is 19.76 m², the loading is 36.5 kg. per sq. m., and the loading per hp. is 720; 134 = 5.37 lb.-hp. The corresponding loadings for the Sopwith "Pup" were 23.4 and 6.6 respectively. The "Camel" has therefore a higher wing loading, but a considerably smaller loading per horsepower.

Detail weight—Motor, 159.0 kg.; propeller, 18.0 kg.; tanks, 12.5 kg.; motor accessories, 12.5 kg.; body with aluminum covering, etc., 48.5 kg.; seat, etc., 9.0 kg.; undercarriage, 39.0 kg.; tail skid, 2.5 kg.; controls, 4.5 kg.; wings, 100.0 kg.; tail plane, fin, rudder and elevator, 13.0 kg.; fittings for armament, 11.5 kg.; total, 430 kg.

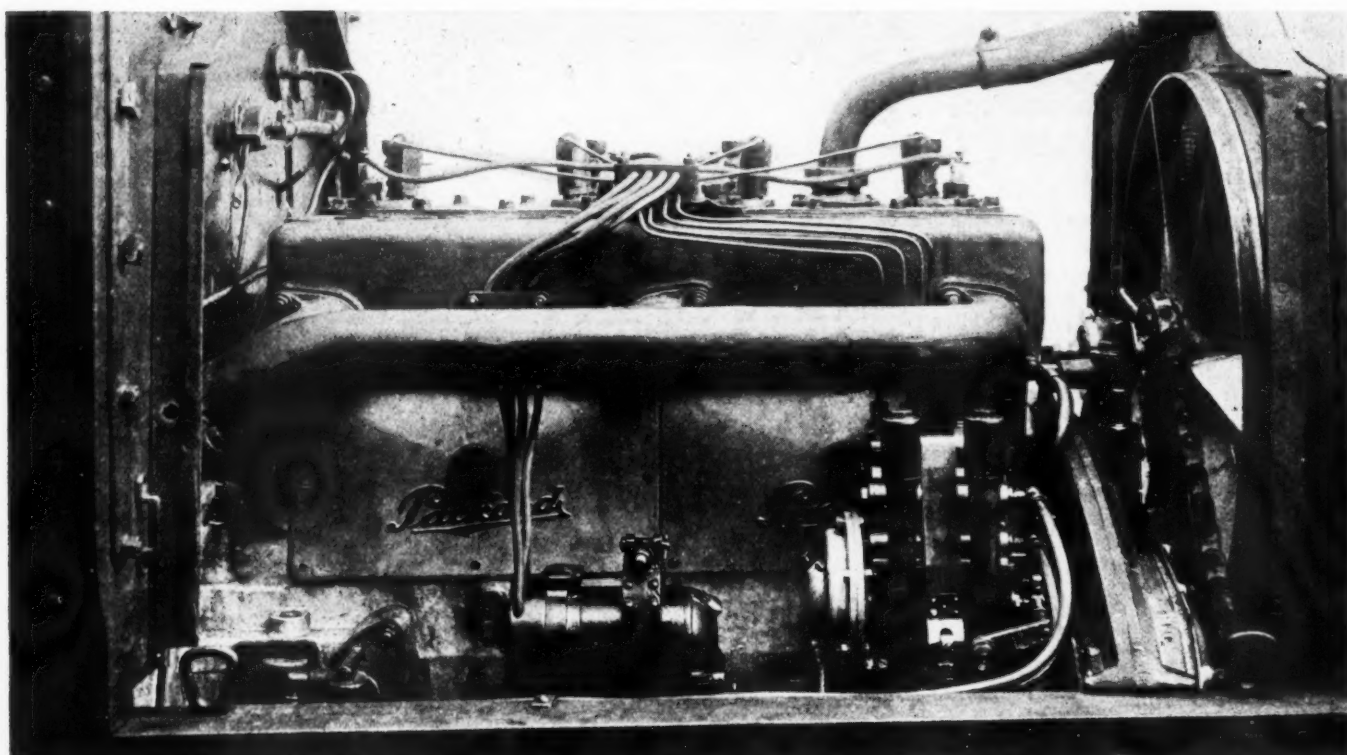
Weight of wings—5.5 kg.-sq. m.

Loading—Pilot, 80 kg.; armament, 60 kg.; 4 bombs, 50 kg.; instruments, 5 kg.; fuel, 150 kg.; total, 290 kg.

The above article is reproduced from *Flight* of London, which had the text translated from the German. All dimensions in the various line drawings are in millimeters.



Front view and plan of the "Camel"



The Bellem equipment applied to a Packard truck engine. The pulverizers may be seen on top of the cylinders and the distributor in the foreground on the right

Bellem Wins French Kerosene Tests

Starts Cold Engine on Kerosene—Engine Running Well in 4 Seconds—Is a Pulverizing Device—Can Be Fitted to Gasoline Engines

By W. F. Bradley

PARIS, FRANCE, Sept. 15.—The Bellem kerosene pulverizer for use on automobile and other engines, enabling them to use kerosene, won first and second prizes in the kerosene engine competition conducted by the Automobile Club of France, and so has carried off the \$10,000 first prize and the \$2,000 second prize. The Bellem device demonstrated that the engine could be running in perfect condition, according to the engineers conducting the tests, in 4 seconds from the time of starting, this being the best record of the test. The time required to get the engine running properly varied from 4 seconds to 45 seconds on the winning engine fitted with the Bellem. The engine started on kerosene, and did not use gasoline at all, although the rules permitted starting with gasoline if necessary.

There was a second engine fitted with the Bellem attachment which used gasoline for starting in some of the tests, and which required sometimes as long as 3 minutes to get into perfect operation.

The six different devices which started in the competition were given four distinct bench tests, as follows:

- 1—A 3-hour test with full load at full speed.
- 2—A 2-hour test with full load at half speed.
- 3—A 3-hour test with half load at full speed.
- 4—A 2-hour test without load at full speed.

After the engines had taken these four tests they were

fitted into a chassis and given a road test of 634 miles in 4 days, at an average speed of not less than 19 m.p.h. Because of their performance on the bench test only the two engines fitted with the Bellem device were eligible for the road test.

The Bellem devices for using kerosene were fitted to two four-cylinder Unic engines with 4 by 5.9 in. cylinders.

During the bench tests it was permissible to make use of gasoline for starting, on condition that a special tank was not employed. No. 1 Bellem was started on kerosene every time. No. 2 Bellem used a small amount of gasoline for starting. The time necessary to get the engines running properly was noted by Lieutenant Lumet, the club laboratory engineer. The best time was that of one of the Bellems, which was running perfectly in 4 seconds. The slowest time of the Bellems was 90 seconds. The slowest time for any competitor was 25 minutes. All the bench tests were made with commercial kerosene of 809 gravity and flash point at 58 deg.

Although applicable to any four-cycle engine, the successful Bellem system entails some changes in construction. The Unic engines used in the competition had originally been standard L-head type, block casting, with carburetor on the valve side. The modification consisted in changing the time of the intake valve, fitting a kero-

sene pulverizer in each cylinder head and placing a kerosene measuring instrument or distributor on the pump and magneto shaft.

The intake valve was timed to open 45 deg. before lower dead center. During this portion of the stroke a partial vacuum is formed in the cylinder, for only a very small quantity of air is drawn in through the kerosene pulverizer mounted in the cylinder head. This initial quantity of air carries with it a quantity of kerosene which has been fed to the pulverizer by the measuring instrument driven off the magneto shaft. This method of injecting the kerosene into a partial vacuum causes very fine pulverization. About 45 deg. before lower dead center the intake valve opens, and closes again 45 deg. after lower dead center. As there is a considerable vacuum in the cylinder when the intake valve opens, the short period during which it remains open is sufficient to get a complete charge even at high revolutions per minute. The charge is compressed to 4 to 5 kilograms per square centimeter and is fired in the usual manner by a high-tension magneto.

Conditions of the Contest

The competition was organized to encourage the use of kerosene for automobile engines, and particularly for truck engines. For this reason the horsepower was limited between 20 and 40, the weight per horsepower had not to exceed 33 lb.—this included flywheel, carbureter, ignition appliances, cooling apparatus, but no water—and the fuel consumption had not to exceed 350 grams per horsepower-hour. Only appliances constructed entirely in France were eligible.

There were six competitors originally, but these dwindled down to four, two of the motors being presented by the Bellem company, one by the Aldo company, and one by the Genault company. Among the two who had en-

tered but did not go through the tests was Ballot, the biggest motor specialist in France.

The competition was originally slated for the early portion of the year, but owing to the military situation was postponed until last month. Incidentally, it was held in Paris, during the great German offensive, within sound of the guns, and while the city was receiving an occasional shell from Big Bertha.

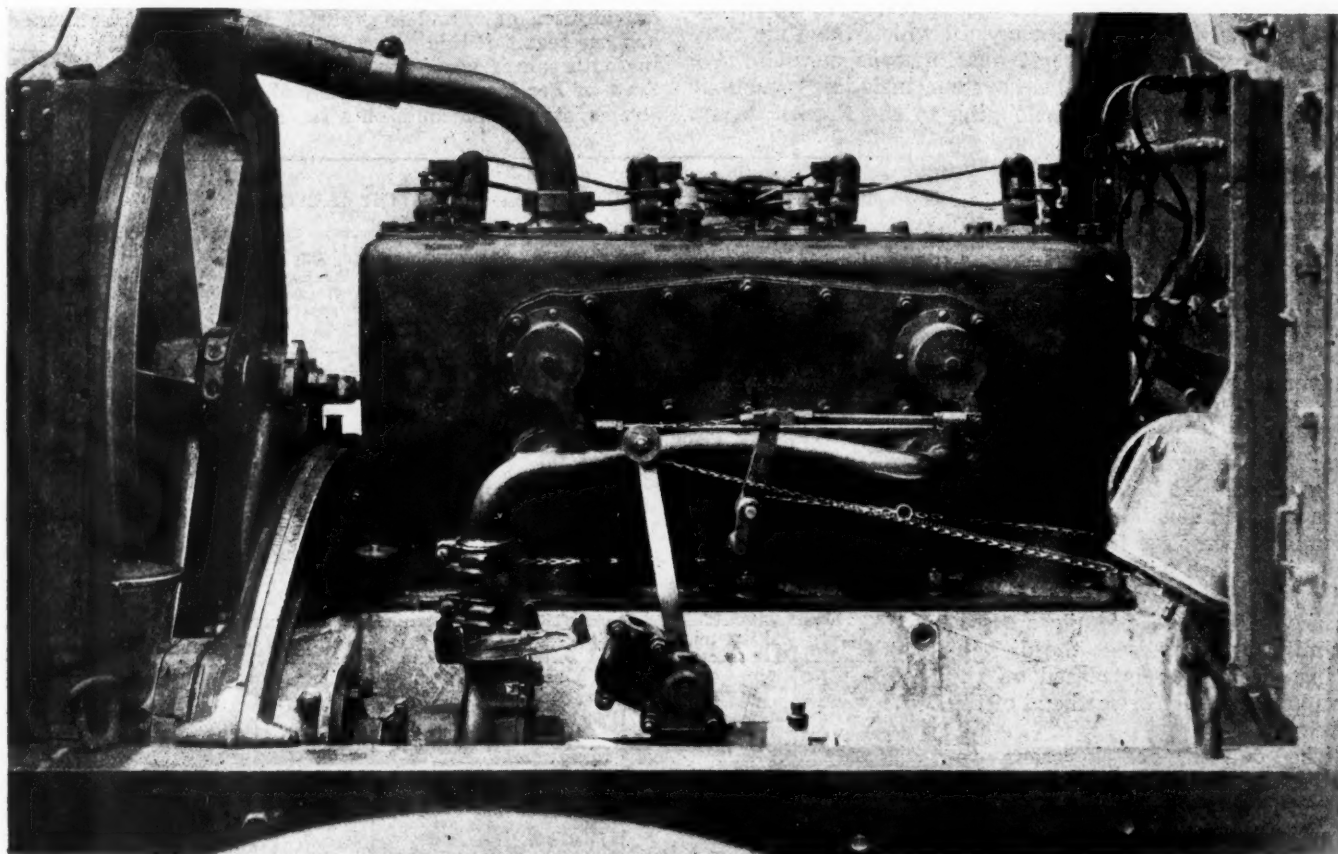
The tabulation on the bench tests gives the horsepower of the different engines, their r.p.m., as well as the consumption in kerosene per hour, which is given in grams. In the full-load test the two Bellem devices showed practically the same power, approximately 32 hp. at 1160 r.p.m. The fuel consumption of one was 334 grams per hour and of the other two 97. The consumption of the two other devices, namely, Aldo and Genault, was so much higher, and their horsepower approximately 50 per cent lower, that they could not be considered factors in the test.

In the 2-hour test with full load at half speed the Bellem devices showed approximately 50 per cent horsepower, and the fuel consumption was 10 per cent greater than when operating at full speed.

With the Bellem devices operating at half load and full speed the fuel consumption was higher than when running with full load at half speed.

When the Bellem devices were operating at full speed without load the fuel consumption was 1.56 gal. per hour.

In the road tests with the Unic engines, fitted with the Bellem devices placed in automobiles, good results were obtained. The total weight of No. 1 car was 3783 lb. in full running order, and its average kerosene consumption was 13.1 miles to the American gallon. The average speed maintained was 25.4 m.p.h. No parts of the engine had to be touched during the road test, and



Left side view of Packard truck engine fitted with Bellem kerosene feeding device



M. Bellem, winner of the \$10,000 prize for kerosene-burning appliances, at the wheel of a Unic car converted to a kerosene-burning machine

the only incidents recorded by the official military observer were a seize brake and a broken feed pipe. The latter was repaired with a piece of gasoline-proof rubber hose.

The second Bellem engine was placed in a new type Unic chassis with a two-seater test body and bags of sand as ballast. The total weight was 3977 lb. Average speed was 24.9 m.p.h., and average fuel consumption 13.2 miles to the American gallon. This car had no engine trouble on the road, the incidents noted being a loose steering connection, a fractured feed pipe and a lost oil plug.

The Bellem kerosene device is manufactured by Bellem & Bregeras, a French company, in which the Unic company is interested. Several gasoline-type engines have been converted by the Bellem system, including a number of Packard 3-ton trucks belonging to the French Army, and also a number of standard engines used in French submarine chasers.

The Bellem device consists of two parts—one, what might be designated a distributing mechanism by which the necessary quantity of kerosene is given to each cylinder for each explosion, and another a pulverizing system by which this quantity of kerosene is completely pulverized, making it possible to start a cold engine without the use of gasoline. No liquid kerosene enters the cylinder, but the pulverization is so complete that a very fine mist is formed within the cylinder. The pulverizing apparatus is fitted in the cylinder head in place of the priming cups, whereas the distributing mechanism is placed on the crankcase at the forward end of the engine.

The quantity of kerosene required for a single explosion in the cylinder will vary from a drop to practically nothing when the engine is running light, and at an engine speed of 1800 r.p.m. this quantity

of kerosene has to be delivered in the short time of one one-hundredth of a second.

The distributing mechanism consists of a cam-operated plunger pump with a cork packing. A variable column of mercury is used to control the pressure of fuel feed. The pump plunger is spring returned, and the amount of fuel fed per stroke can be controlled by means of a stop which is interlinked with the throttle valve.

The kerosene from the distributor goes to the pulverizers, which are placed in the cylinder heads in place of the priming cups. In some cases this pulverizer is an automatic valve, but on the Unic competition engines it was mechanically operated by means of an overhead camshaft. This comprises a hollow-stem poppet valve. On the beveled edge of the valve head, and within the valve seat, are a number of

equally spaced holes. When the valve is forced from its seat, either mechanically or by suction, air is drawn through the hollow stem and through the fine holes in the valve head, and these horizontal streams of air impinge upon the vertical currents of air and fuel coming through the fine holes in the valve seat, thus thoroughly pulverizing the fuel.

IN view of the increased demand for tungsten ores, it is interesting to record a substantial increase in the exports from the Federated Malay States in 1917. The Federated Malay States Government has suspended the export duty on tungsten ores, and is granting free prospecting licences, and one result of this policy is the trebling of the output since the outbreak of war. The chief cause of the increase in the State of Perak was the discovery of two very rich non-extensive deposits of scheelite on a tin-mining property.

French Bench Tests on Kerosene

Name of Competitor	Starting on Kerosene or Gasoline	Running in on Kerosene	Average Speed, R.p.m.	Average Horse-power	Consumption per Hour	Average Temperature Water Outlet, Centigrade
3-HOUR TEST WITH FULL LOAD, AT FULL SPEED						
Bellem No. 1	Kerosene	45 sec.	1152	32.4	334 gr.	44 deg.
Bellem No. 2	13 cu. cm. of gas.	1 min.	1163	33	297 gr.	39 deg.
Aldo	470 cu. cm. of gas.	9 min. 30 sec.	1051	24	394 gr.	26 deg.
Genault	300 cu. cm. of gas.	2 min.	1749	22.6	365 gr.	58 deg.
2-HOUR TEST WITH FULL LOAD, AT HALF SPEED						
Bellem No. 1	Kerosene	4 sec.	655	16.2	372 gr.	45 deg.
Bellem No. 2	Kerosene	50 sec.	645	15.2	353 gr.	43 deg.
Aldo	520 cu. cm. of gas.	15 min.	607	14.6	546 gr.	23 deg.
Genault	350 cu. cm. of gas.	10 min.	864	3	714 gr.	66 deg.
3-HOUR TEST, WITH HALF LOAD, AT FULL SPEED						
Bellem No. 1	Kerosene	45 sec.	1177	13.9	423 gr.	50 deg.
Bellem No. 2	30 cu. cm. of gas.	1 min. 50 sec.	1242	16.24	374 gr.	53 deg.
Aldo	400 cu. cm. of gas.	2 min. 30 sec.	1094	12.95	387 gr.	27 deg.
Genault	300 cu. cm. of gas.	25 min.	1743	11.73	521 gr.	65 deg.
2-HOUR TEST, WITHOUT LOAD, AT FULL SPEED						
Bellem No. 1	Kerosene	12 sec.	1252	....	1.56 gal.	47 deg.
Bellem No. 2	Kerosene	3 min.	1270	....	1.45 gal.	50 deg.
Aldo	390 cu. cm. of gas.	20 min.	1082	....	1.03 gal.	26 deg.
Genault	300 cu. cm. of gas.	3 min.	1675	....	0.76 gal.	75 deg.

Foote-Strite Tractor Transmissions

Made in Models Suited to Tractors with Longitudinally and Transversely Mounted Engines — Given Either Two or Three Forward Speeds — Belt Pulley Drive Is Incorporated, with Transmission

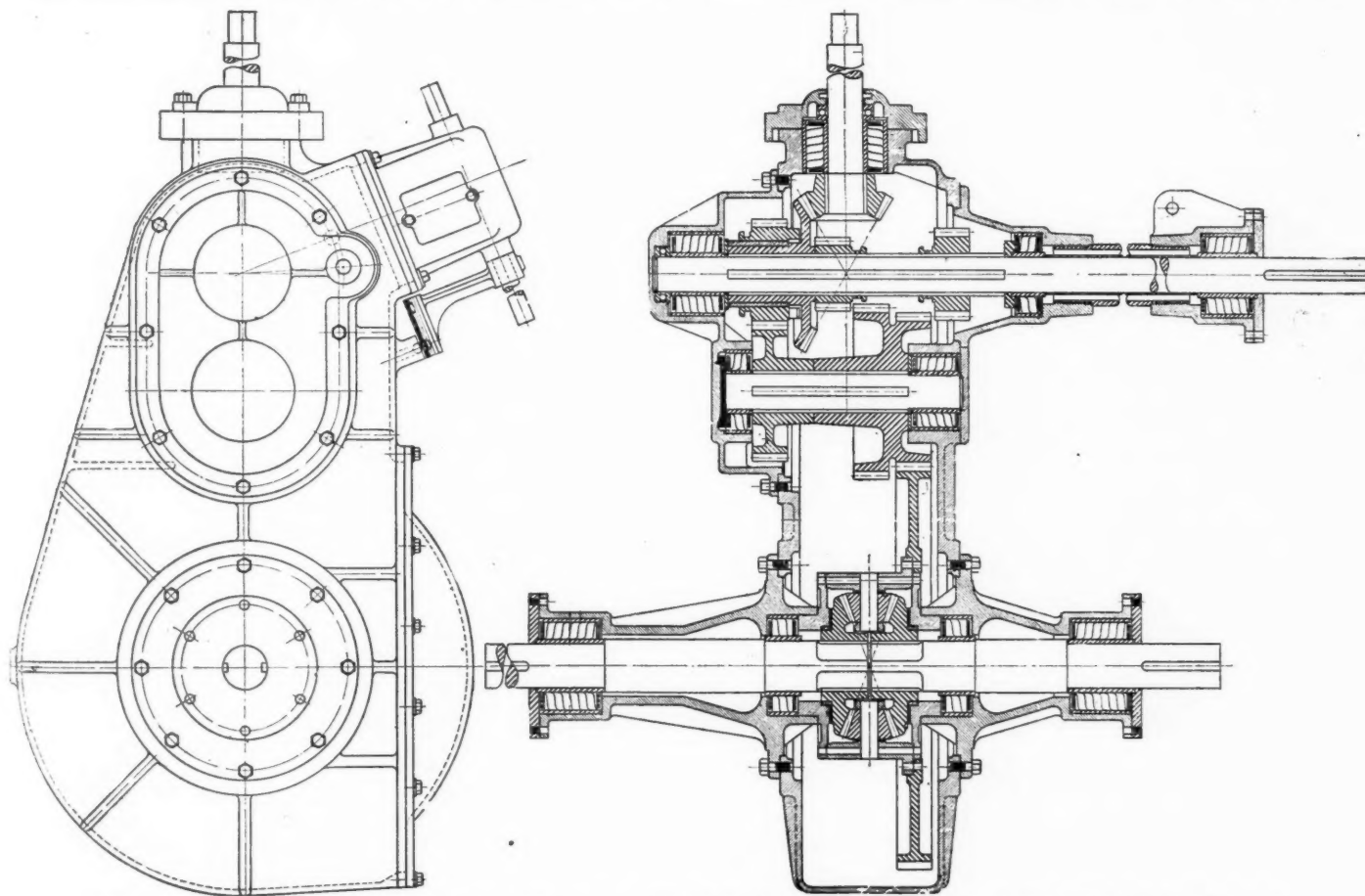
FOOTE BROS. GEAR & MACHINE CO., Chicago, Ill., are producing a line of tractor transmissions from designs by George T. Strite, the well known tractor engineer. These transmissions are so designed that they are readily adaptable to almost any design of tractor, and a wide range of gear reductions can be obtained. One style of the transmission is designed for tractors on which the engine is arranged longitudinally and the other for tractors in which the engine sets crosswise. In the former the first reduction is by a pair of bevel gears. The shaft on which the driven member of the bevel gear set is mounted is of the splined type and also carries two sliding pinions and the belt pulley. The shaft is made of a length to bring the pulley the desired distance from the transmission housing and is surrounded by a tube to which a bearing housing can be fitted at the outer end. The inner end of the tube screws into the cast iron transmission case. The design of the outer end is left open, as it has to be varied according to frame design, general layout of power plant, etc.

The two sliding pinions are arranged to be slid into mesh with the two gear crowns of a double intermediate gear respectively, by means of a selective control mechanism mounted on top of the transmission housing. One of the gears of the intermediate set meshes with the gear on the differential, and a

variation in gear reduction can be made by using either the smaller or the larger gear of the intermediate set for the purposes. Other variations are made possible by changing the sizes of the sliding pinions and of the differential crown gear. In fact, the latter may be made with from 48 to 72 teeth. The differential, which is of the self-contained bevel pinion type, is mounted on the jackshaft, from which the drive is to the rear wheels by bull pinion and gear, the latter either of the spur or internally toothed type.

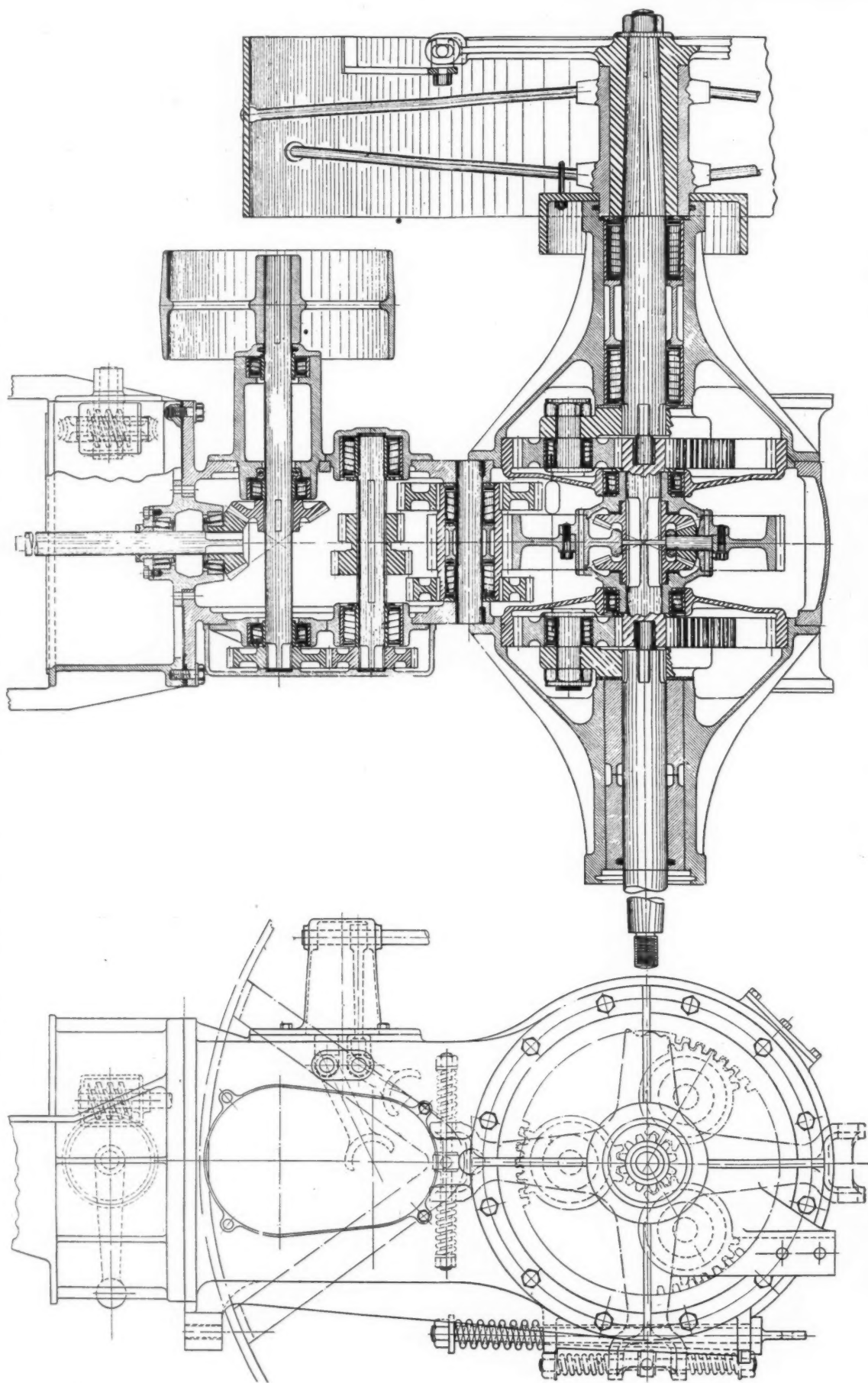
With a transversely mounted engine the bevel gear reduction is dispensed with and the splined shaft carrying the sliding pinions is direct connected to the clutch shaft. The transmission is then an all-spur design. In this case the forward part of the transmission is located alongside of the engine and the narrow width of the transmission case makes this possible. A flange is cast on the transmission housing which joins directly to the engine bell housing.

It was stated above that the housing was of cast iron, and while this is the material mostly used, the Foote company is also prepared to furnish housings of semi steel or cast steel. It will be noticed that the main part of the housing is in a single casting, which, together with the well-planned ribbing, makes for great rigidity. There is a large opening on top, covered by a hand hole plate, through which the differ-



Side elevation of and horizontal section through Foote-Strite transmission, with first reduction by bevel gears

Foote-Strite Model DU Tractor Transmission.



With this transmission is combined the rear axle which has a drive through planetary pinions. All shafts run on roller bearings and a spring drive to the wheels is provided for

ential and other parts may be introduced. There are two tapering jackshaft housings which bolt to the sides of the transmission and carry the bearings for the differential and the jackshaft. The jackshafts are supported in Hyatt roller bearings near the bull pinions, while the differential is carried in parallel bearings. There are also Hyatt roller bearings on the splined shaft, and where the bevel gear set is used ball thrust bearings are mounted back of both the driving and driven gears to take the thrust. The intermediate gears turn on a stationary shaft keyed in the housing.

Three-point support is used, each of the jackshaft housings having a smooth-turned belt at which the transmission can be clamped to the frame, and the third point of support is at the forward end.

Efficient lubrication is provided for, as all gears operate in a bath of oil. This also takes care of the bearings. Transverse partition walls to both sides of the intermediate gears insure that the latter always dips in oil. Gear reductions are such that a plowing speed of 2 to 2½ m.p.h. is obtained, depending on the engine speed. As the plowing speed can be made either the high or the low speed, the extra speed will be either lower (about 1½ m.p.h.) or higher (3½ m.p.h.). The reverse, which is obtained by means of a pair of intermediate gears, is always equal to the low speed.

The Foote-Strite transmission is recommended for engines up to 30 hp. and weighs approximately 550 lb. ready for shipment. The sliding pinions are made from low-carbon steel forgings, case hardened and ground, while the large gears are made either of high-carbon steel or of drop forgings and case hardened. Either carbon or nickel steel shafts are used, and are cut with integral splines. Provisions can be made for braking on either side of the differential or on both sides.

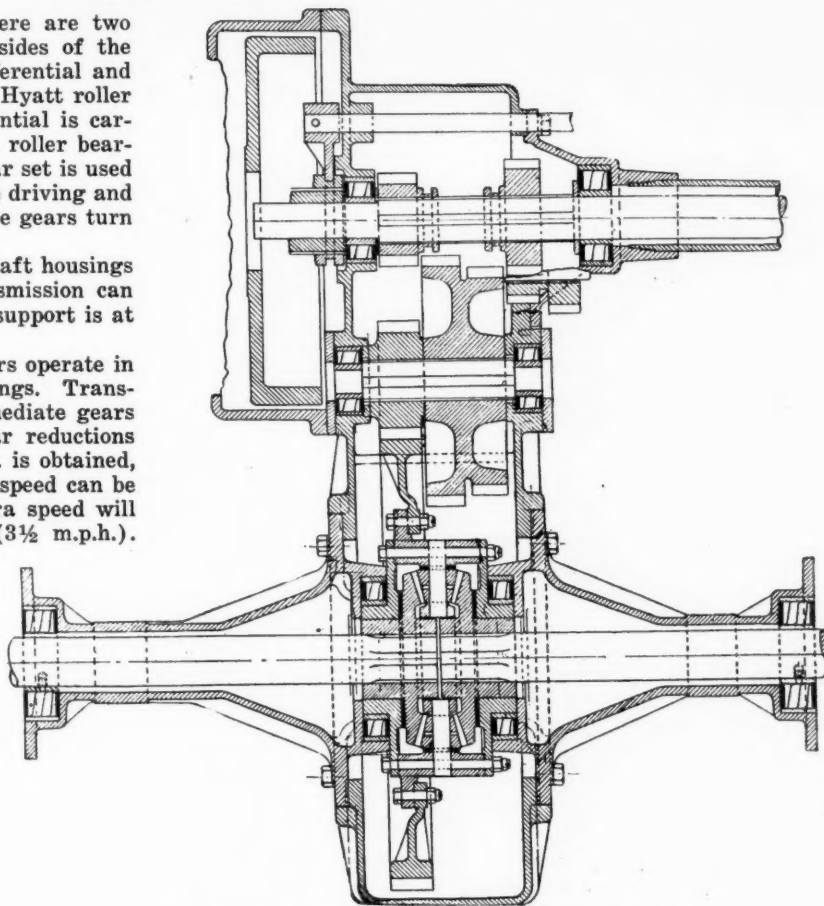
An additional transmission for 30-40 hp. tractors has recently been added to the line and is known as No. 2 A. Hyatt roller bearings are used throughout in this transmission, even in the reversing gears. This transmission can be furnished to give either two or three forward speeds, and the three-speed design is herewith illustrated. In this design the range of speed obtainable is further increased by the possibility of interchanging or reversing the two gears of the high speed set.

The new gear shifting and locking mechanism is now used on all models of the Foote-Strite transmission. There are three shifting forks, one for each sliding pinion. The gear lever operates in a slotted plate and is provided with a locking quadrant which holds it in the neutral position or in the position of full mesh.

In conformity with the latest tendencies in tractor design the Foote company has brought out a combined transmission and rear axle, the housing of which will also serve the function of the frame. This is the new Model DU intended for tractors pulling three or four plows. It is for a live axle type of design and gives a ratio of 70 to 1 on low gear and 50 to 1 on high. There is an arrangement on the outside of the gearbox by which changing a set of gears gives a ratio of 82 to 1 on low and 58 to 1 on high. This change can be made, it is said, in five minutes. This new gearset weighs 1750 lb. and uses Hyatt bearings all through, except that there are two Timkens on the clutch shaft which carries the bevel gear.

Splined shafts are used throughout and all gears are of vanadium steel, except the two large diameter internal gears. The rear axle drive shafts of the set are 3 in. in diameter and are carried either on graphite bushings or Hyatt rollers. The set is designed for using tractor road wheels of 48 to 54 in. diameter. The complete set is suitable for tractors with a wheel base ranging from 84 to 96 in. according to the desires of the tractor maker.

Using this model of gearset a rear frame on the tractor is not needed, as the housing for the gearset forms the rear axle and the frame, so that the frame structure is limited to two side uppers which extend forward from the gearbox and support the engine.



Foote-Strite transmission with spur gears only

On the front of this gearset is used an S. A. E. No. 2 bell housing. There are but two bevel gears in the set. In connection with this gearset the spring drive in the rear wheel as shown on the Trojan tractor is used.

British Exhibit of Enemy Aircraft

IN the Agricultural Hall at Islington, near London, where automobile shows were held in former years, there is now being staged a most interesting exhibition of captured enemy aircraft and engines. The exhibit is under the direction of the Controller of the Technical Department, Aircraft Production, Ministry of Munitions. It comprises examples of nearly all the types of German aeroplanes which have been captured during the war, and thus represents very completely the development of enemy aircraft design. The object served by the museum is twofold, firstly to enable designers and constructors to keep in close touch with what their German rivals are doing, and secondly to provide pilots and cadets with first-hand information which will not only help them to recognize hostile machines, but will also indicate their most vulnerable points. For these purposes all the aeroplanes are treated in the same manner, one-half being entirely stripped so as to expose any structural detail, the other half left intact. Among the numerous exhibits may be mentioned the Friedrichshafen and Gotha bombing planes, the Fokker biplane and triplane scouts, and the Hannoveraner and Halberstadt fighters.

WE are in receipt of a copy of the Cleveland Worm & Gear Co.'s catalog of Cleveland worm gear drives. This catalog, in addition to an exposition of the company's product, contains much tabular matter of use to the designer. There are charts and formulæ for determining worm and worm wheel bearing loads, a table of English and metric equivalents, a collection of rules for the solution of problems connected with right angled and oblique triangles, and numerous mathematical tables.

What Langley Did for the Science of Aviation

Seven Years After Langley's Death His Theories Were Fully Vindicated by a Successful Flight Made by the Langley Man-Carrying Aerodrome Piloted by Glenn H. Curtiss

PART IV

IT WAS seven years after Langley's death, or in the spring of 1914, that the world first knew that he had accomplished what he had set out to do.

For ten and one-half years he had struggled with the development of the basic science of mechanical flight, had made exhaustive experiments and countless tests, only in the end to meet with what was regarded by all except himself and those close to him as very little short of ignominious failure. Judged by an unenlightened press whose influence with those who could have provided the means for continuing Langley's experiments was sufficient to shut off further funds, his work in aviation terminated with the failure in December, 1903, to fly his man-carrying machine, which was later demonstrated to have been scientifically correct and capable of performing what it was built to do.

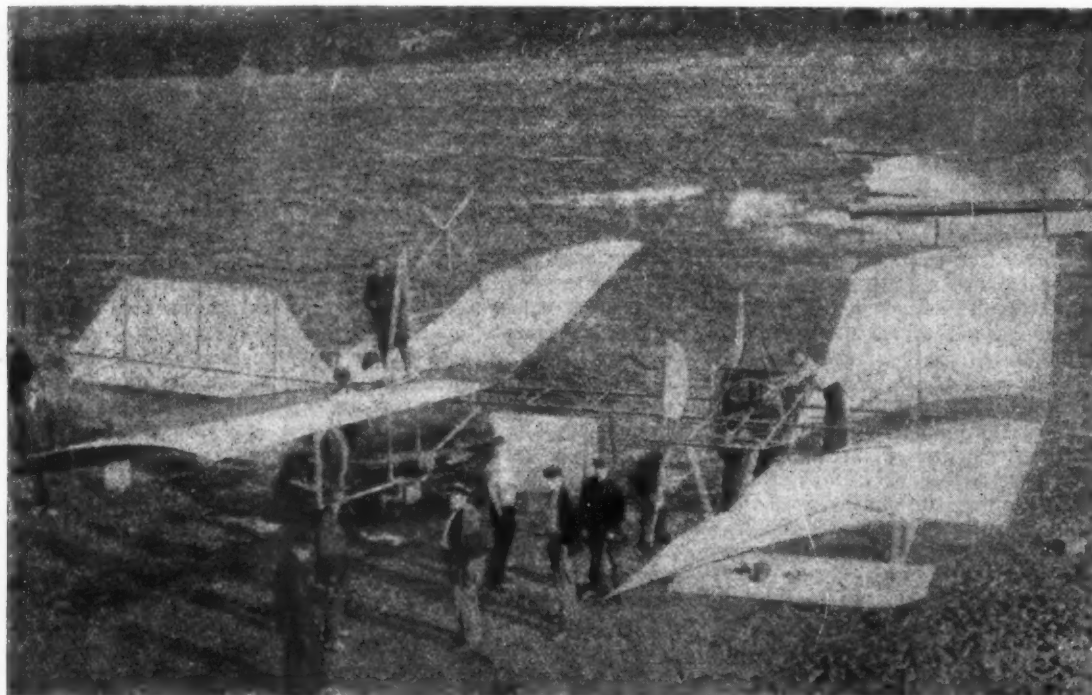
In March of 1914, eleven years later, Glenn H. Curtiss was invited to send one of his flying boats to Washington to take part in the celebration of "Langley Day." In response to this invitation, Curtiss replied that he would like to have the opportunity to fly the Langley aerodrome itself on that occasion, and he was finally permitted to have the original machine shipped to his plant in Hammondsport, N. Y., there to be put into condition for further tests and for flight, if possible, either with

its original power plant or with a more modern one of Curtiss' design.

The machine was shipped the following month, and a month later, with re-covered wings, was ready for its first trial since the accident which terminated Langley's experiments.

It was the purpose of these new trials, first, to show whether the machine, as Langley had designed and built it, was actually capable of sustained free flight, carrying a pilot, and also to learn more fully whatever advantages there might be in the tandem type construction. Both of these objects were accomplished, and it was found that Langley had indeed produced a successful flying machine.

In his attempts to fly the aerodrome, Langley, as has been recorded in previous articles in this series, made use of a launching device, built on the roof of a houseboat which was anchored in the middle of the Patomac River. The aeroplane was supported on a car which was drawn swiftly along the launching track by means of long spiral springs and, through the medium of an automatic releasing device, was suddenly dropped from the end of the track, free in the air. Careful consideration was given by Mr. Curtiss to this method of launching, and, while he considered it a practical plan, he did not consider it



Langley man-carrying airplane (built 1898-1903) ready for launching at the Curtiss Aviation Field, Hammondsport, N. Y., May 28, 1914

Elwood Doherty leaving the water September 17, 1914, in the Langley airplane driven by a Curtiss 80-hp. engine and a tractor propeller



wise to adopt it. He also considered starting the aeroplane from the ground, by means of wheels, from the ice, using runners similar to those of an ice-boat, and from the water by means of floats. The last method was finally adopted.

A description of the machine when it was ready for its first tests at the Curtiss plant at Lake Keuka is given by Dr. A. F. Zahm: "The steel main frame, the wings, the rudders, the engine and propellers all were substantially as they had been in 1903. The pilot had the same seat under the main frame, and the same general system of control as in 1903. He could raise or lower the craft by moving the big rear rudder up and down; he could steer right and left by turning the vertical rudder.

"He had no ailerons nor wing-warping mechanism, but for lateral balance depended upon the dihedral angle of the wings and upon suitable movements of his weight or of the vertical rudder, and herein it may be noted that Langley had placed the vertical steering rudder under and to the rear of the center of gravity. So placed, it served as a fairly good aileron by exerting a turning movement about the longitudinal axis of the machine."

On May 28, 1914, after adjustments had been completed and with a light breeze blowing, the aeroplane was placed upon the water by a number of men who lifted it from the bank and waded in to a sufficient depth so that it would clear the land, the engine, which was the original Langley power plant, was set going, and with Mr. Curtiss at the wheel, the large tandem-winged craft started off over the water, across the wind for a short distance and then, acting automatically, headed into the wind and rose into the air, soaring for about 150 ft. and landing lightly again upon the water. In this short flight Mr. Curtiss decided that the large rear rudder should be made to turn on a vertical as well as on a horizontal axis, as the pressure of the wind against it made the whole machine act as a weather-vane and it was difficult if not impossible to steer in any direction except head on in the wind.

Following this initial trial, several other short flights were made with the machine equipped with the original engine and twin propellers, but, as the engine never developed the power which had been obtained from it in brake tests made by Langley in Washington, it was taken out and a Curtiss 80-hp. engine with direct-connected tractor propeller was substituted.

As equipped by Langley, the total weight of the ma-

chine and pilot was 830 lb. The floats added for the experiments at Lake Keuka brought the total weight to 1170 lb., and with the Curtiss engine substituted for the original power plant, the total weight became 1520 lb. This gave a total added weight above the original weight of approximately 85 per cent, but during the experiments the wing spars and ribs, although designed for a much lighter load, stood the added strain without any evidence of giving way under it.

For several reasons which it is not necessary to recount here, as they had to do with matters entirely independent of the machine itself, work was suspended on the Langley plane at the Curtiss plant until the following September. At that time, in the absence of Mr. Curtiss, Elwood Doherty, a pupil in the Curtiss Aviation School, volunteered to act as pilot in further tests, and on the afternoon of Sept. 17 he succeeded in flying for about 450 ft. at an elevation of two or three yards.

A few days later, using a 9-ft. screw, Mr. Doherty made a number of longer flights in a breeze which was sufficient to ripple the surface of the water without causing whitecaps. A description of this flight is given by Dr. Zahm in his account of these experiments: "A dozen workmen, lifting the great tandem monoplane from the shore with the pilot in his seat, waded into the lake and set it gently on the water. A crowd of witnesses near at hand, and many scattered about the shores and on the lofty, vine-clad hills, stood watching expectantly. When some of the official observers and photographers, in a motor boat, were well out in the lake, a man in high-top boots, standing in the water, started the propeller and stepped quickly out of the way. Then with its great yellow wings beautifully arched and distended, the imposing craft ran swiftly out from the shore, gleaming brilliantly in the afternoon sun. At first the floats and lower edges of the rudders broke the water to a white surge, then as the speed increased they rose more and more from the surface. Presently the rear floats and the rudders cleared the water, the front floats still skipping on their heels, white with foam. The whole craft was now in soaring poise. It quickly approached the photographers, bearing on its back the alert pilot, who seemed to be scrutinizing every part of it and well satisfied to let it race. Then it rose majestically and sailed on even wing 1000 ft.; grazed the water again, rose and sailed 3000 ft.; turned on the water and came back in the same manner; and, as it passed the photographers, soared again



Flight of Langley airplane above Lake Keuka, September 17, 1914, piloted by E. Doherty and driven by a Curtiss engine and tractor propeller

nearly half a mile. The flights were repeated a few minutes later, then, owing to squally weather, were discontinued for 11 days."

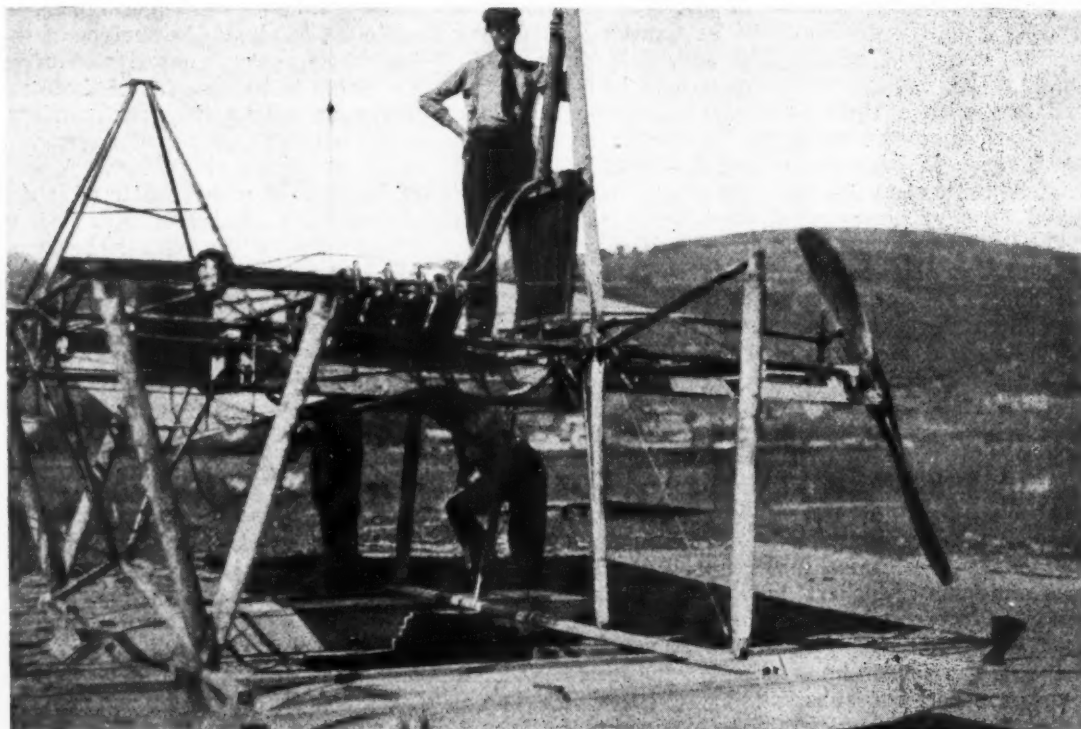
Following these flights came others, on other days, of 1000, 2000, 2250 and 3250 ft. at altitudes averaging better than 30 ft. No longer flights were attempted, as it was not deemed wise to run the risk of injury to the machine, especially as this risk was increased through carrying an excessive overload. The fact that the machine would fly was clearly demonstrated and it was also proved beyond the semblance of a doubt that Langley had actually produced a machine which would have flown but for a minor accident, which, had it occurred to-day, would be regarded as insignificant.

Records of engine tests made by Langley and Mr. Manly, who was associated with him, showed that a static thrust of 450 lb. had been obtained. At Hammondsport, however, the output of the engine fell nearly 100 lb. short of this amount. If, therefore, the engine and propellers could have been restored to their original

working condition, they would undoubtedly have been able to drive the machine in flight even with its aggregate weight at that time of nearly 1600 lb., or about double that which it was designed to carry. With the extra weight removed and with the engine developing a thrust of 450 lb. as it had in its early tests, the Langley aeroplane would have been able, the experiments at Lake Keuka clearly demonstrated, to have carried a man and sufficient supplies required for a flight lasting nearly a whole day.

Dr. Langley's work may be briefly summarized as follows: His experiments were sufficiently complete to form a basis for practical pioneer aviation; he built and launched in 1896 the first steam model airplane capable of prolonged free flight; he built the first internal combustion engine suitable for a man-carrying machine; he developed and launched successfully the first gasoline model airplane capable of sustained free flight, and he developed and built the first man-carrying airplane capable of sustained free flight.

Showing the Curtiss 80-hp. engine and tractor propeller installed on the Langley airplane at the Curtiss plant. Prior to this the airplane had flown successfully with its original power plant



British Airplane Activity

Operations Undertaken in Four Main Theaters of War, Extending from the Belgian Seacoast to the Mountain Fastnesses of Samaria and the Rim of the Syrian Desert

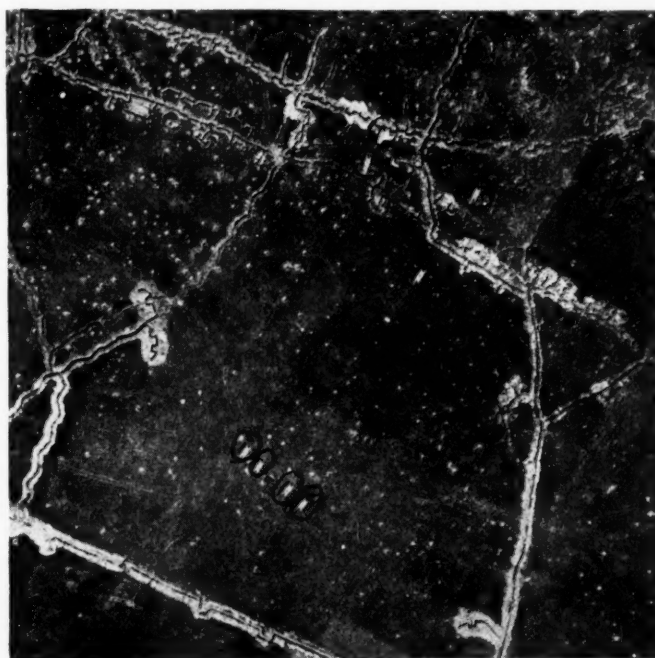
WASHINGTON, Nov. 1.—During a recent week British airmen have been heavily engaged in the four main theaters of war, from the Belgian coastal sector of the north to the rocky defiles of Samaria and the fringes of the Syrian desert. The heaviest air fighting has taken place north of the Arras-Cambrai road, where large enemy air forces have been thrown into the battle. On this front, in addition to dropping nearly 140 tons of bombs and firing an immense number of rounds of small-arms ammunition, British airmen have destroyed 69 enemy machines and driven down 24 out of control. Five hostile machines have also been brought down by anti-aircraft fire, making a total of 98 enemy aircraft accounted for on the British western front during the week. In the same period 46 British machines were reported missing.

On the Rhine front the R. A. F. Independent Force has discharged a heavy weight of bombs upon enemy railway and industrial centers in the course of 22 successful raids into German territory. In all, 511 tons of bombs were dropped during the week upon the railways at Frankfort, Treves and Metzablon, blast furnaces at Hagendingen and Rombach, the Lanz Works at Mannheim, factories at Burbach and Karlsruhe, and the hostile aerodromes at Boulay, Frescaty, Morhange, etc. Many direct hits were observed both at Treves and Mannheim, while extensive fires were started at Metzablon, Karlsruhe and among the hangars at Frescaty and Morhange, although necessarily upon a smaller scale than in the West.

In Palestine, during the past week, contingents of the Royal Air Force and the Australian Flying Corps have been carrying out reconnaissance upon a wide scale over the maritime plane, stretching from Mount Carmel to

the Shechemjopha road, as well as over Samaria and the Valley of the Jordan, from the edge of the Judaeen plateau to the Sea of Gallilee.

On the Italian front, in addition to much valuable reconnaissance and photographic work done, successful air fighting has taken place. During the week 6 enemy machines have been destroyed and 3 driven down out of control. All British machines returned safely.



The photographs reproduced herewith were taken by the crews of British reconnaissance machines. The upper one is a scene along the battle front and shows eight allied tanks proceeding toward the German lines, four of them running abreast while the others are scattered. The lower photograph shows a fleet of motor trucks lined up along the curb in the center of a village

Maybach 300-Hp. Aircraft Engine

PART II

Details of the Valves and Valve Gear and Design of the Crankshaft and Crankcase

THE twin inlet and exhaust valves work vertically in cast-iron valve stem guides in the cylinder heads, and are operated by rocker levers mounted on roller bearings, each pair of valves being operated by a single tappet rod from one of the camshafts in the crankcase.

Valves—The heads of all the valves, both inlet and exhaust, are of the same diameter, *i. e.*, 54 mm., and the angle of the valve seats is 30 deg. in each case.

The inlet valves are machined concave under the head, and are formed with a 20 mm. radius between the valve stem and the head. The exhaust valves are convex in the head, and are made with a compound radius between the valve stem and the head of 9 and 25 mm. The diameter of all the valve stems is 11 mm., the clearance in the guide bushes being 0.12 mm. (inlet) and 0.15 mm. (exhaust) (cold). The ends of the valve stems are fitted with hardened steel disks, which are bedded in the recessed ends of the stems.

The inlet valves are 136.5 mm. long overall, while the exhaust valves are 152.5 mm. in length. The exhaust valves are made longer to allow for the extra water cooling space in the cylinder head above the exhaust valve pocket already referred to.

All the valve springs, however, are of exactly the same length, *i. e.*, 52.5 mm. free, and measure 39.5 mm. when in their position in the cylinder, initially compressed with no valve lift. The diameter of all the valve springs is the same, 51 mm. (central diameter of coils), and the gage of wire is 5.22 mm. in all cases.

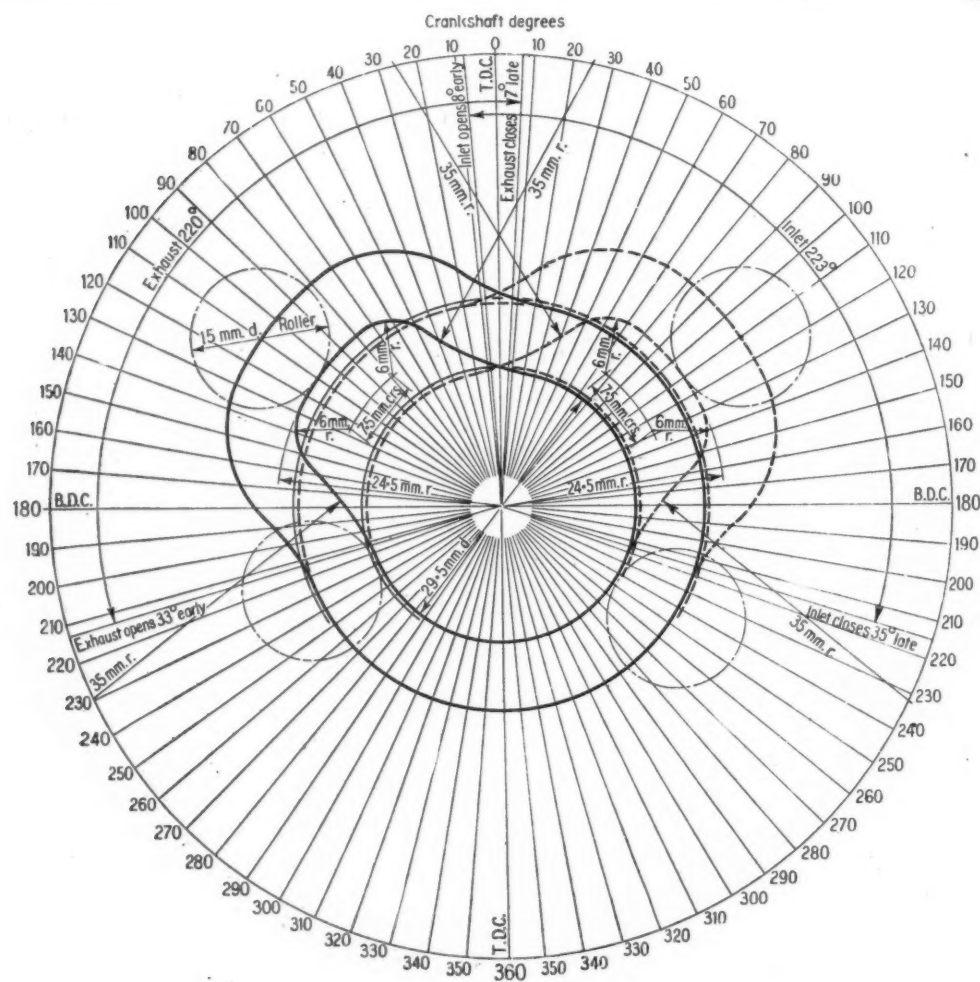
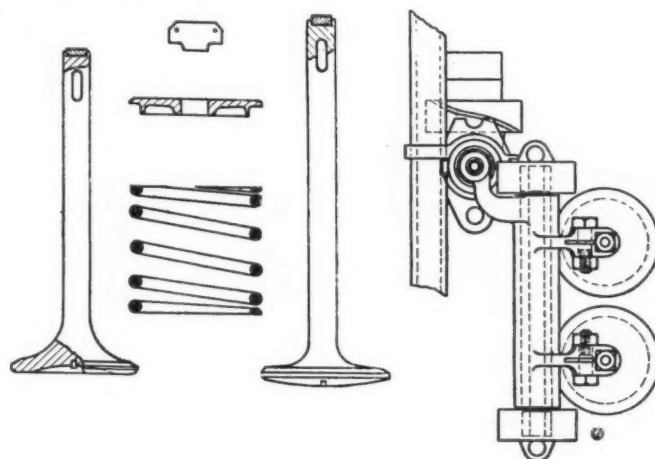


Fig. 9—Cam layout diagram

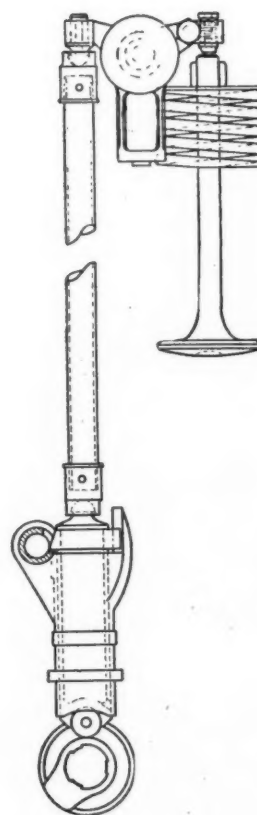
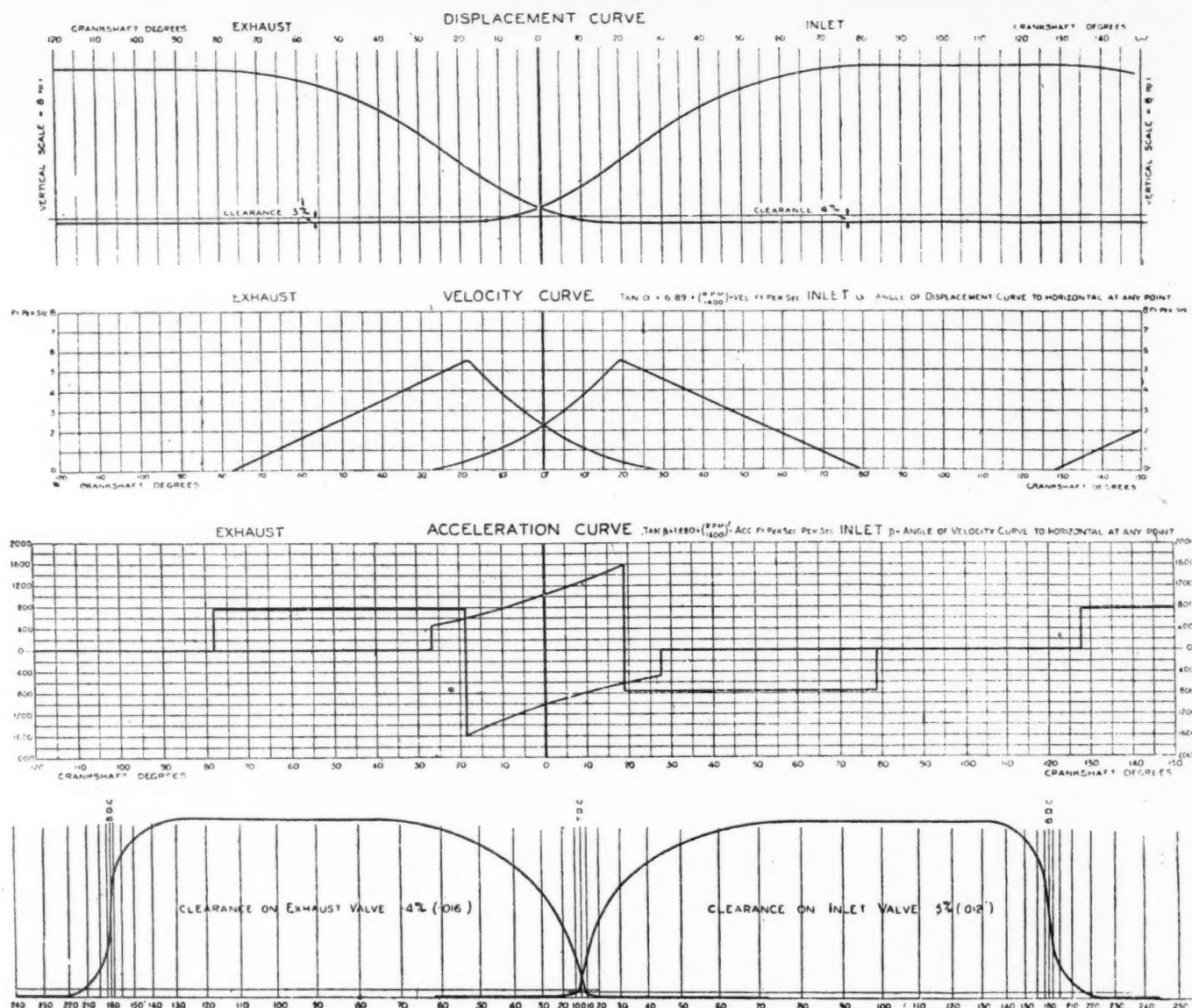


Fig. 10—Valves and valve gear



Figs. 10, 11, 12 and 13—Diagrams of valve lift, velocity and acceleration

The valve springs are fitted with plain collars at the top. These are secured by T-shaped cotters through the valve stems in the usual way. These are also locked in position with small wire clips, which are fitted to the spring cotters through two small holes. The surface of all the valve spring collars is galvanized or plated with a tin or zinc deposit of some nature, apparently to prevent corrosion. This form of galvanized exterior finish is carried out on several other parts of the engine.

Details of the valves and valve springs are given in Fig. 10.

Valve Rockers—The roller bearings carrying the spindles of the valve rockers are mounted in short brackets, each of which is attached to the cylinder heads by two 8 mm. studs and castellated nuts. The bearing brackets are steel drop forgings, and the roller races are, to a certain extent, permanently fixed inside the recessed heads of the brackets, and are covered by thin steel disks fitted over the front faces of the bearings, these being held in position by a form of mechanical knurling largely used in German aero engine manufacture. This mechanical process takes the form of spinning or riveting over the housing metal of the part by a series of accurately spaced indentations.

The hardened steel set screws for the adjustment of the tappet clearances are drilled with a 5 mm. hole in the center portion through the squared end only, and the usual form of transverse locking bolt is provided. The method of splitting the lever to provide for the locking of the tappet adjusting screw, however, is carried out in a somewhat unusual way. This is shown in the view of the rocker lever in Fig. 10, from

which it can be seen that the saw-cut is made from the tappet hole, which takes the tappet adjusting screw backward through the center of the rocker lever toward the rocker spindle.

A steel stud having a hardened hemispherical end, which makes the top joint of the valve push rod, is fitted on the outer lever of the valve rocker. These steel studs are driven tightly into the levers and are secured by small steel wire rings snapped over semicircular grooves cut in the top end of the spherically-ended studs.

The tappet push rods are made of steel tube 16 mm. outside diameter, and are fitted with hemispherical hardened steel cups at each end. These are fixed to the push rods by taper pins and weigh 0.48 lb. each.

Hardly any alteration has been made in the familiar tappet design. The tappets consist of hollow steel tappet barrels, which are plugged at the top ends by hardened steel caps. The tops of these caps are formed with hemispherical heads, which engage with the lower ends of the cupped push rods.

The hardened cam rollers are held in position by the grooves machined in the bottom ends of the tappet barrels. These grooves are made slightly more than a semicircle to prevent the roller from falling out. Side movement of the rollers is prevented by the tappet guides. The cam rollers are 15 mm. in diameter, and are bored with a 4.5 mm. hole.

Four small holes are bored radially in the sides of the hollow tappet barrels, which always carry a certain amount of oil, thus providing a very simple, efficient method of lubricating the tappet guides. These are made of gunmetal, and

and the propeller is secured by castellated nuts in the usual manner. The surface of the propeller hub and flanges is galvanized with deposited tin to prevent corrosion. The front flange floats on the propeller hub in four castellations, 17 mm. wide by 3 mm. deep. The total weight of the complete propeller hub, with all bolts, less extension flange on end of crankshaft = 21 lb.

Unlike most of the enemy aero engines, the bottom halves of the crankshaft main bearings are bolted to the top half of the crank chamber. These are very deep in section, and are secured to the crank chamber by 19 mm. diameter bolts, which pass through the crank chamber, and are also used to bolt down the cylinders by means of triangular clamps, now almost standard practice. Flanges are machined at the top end of the holding-down bolts, which are let into recesses cut in the top face of the crankcase. The front main bearing cap also carries below the intermediate gear pinion for driving the oil pumps as shown in the general arrangement of the engine. Cast aluminum covers are bolted to the front and rear ends of the crankcase for enclosing the camshaft driving gears at the front ends, and for the magneto and interrupter gears at the rear end of the engine. Further details of the crankcase construction are shown in the illustrations.

The lower half of the crank chamber presents several points of interesting design, and is of simple construction, weighing 41.32 lb. bare. At the rear end of the flange, which is bolted to the top half of the crank chamber in the usual way, extended brackets are cast for taking the two magnetos, and the three gear type oil pumps are situated on brackets cast on the bottom of the inside of the base chamber.

The small detachable oil sumps are fixed to flanges cast on the under side of the base, one at each end.

Details of the construction of the oil pumps and detachable oil sumps are given in the notes on lubrication.

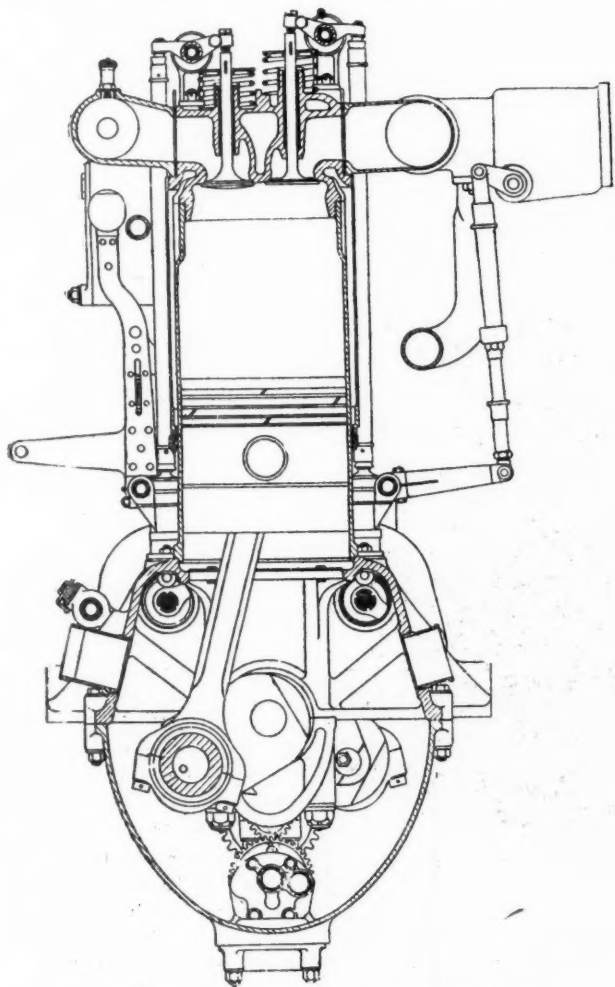


Fig. 16—Section through cylinder and crankcase

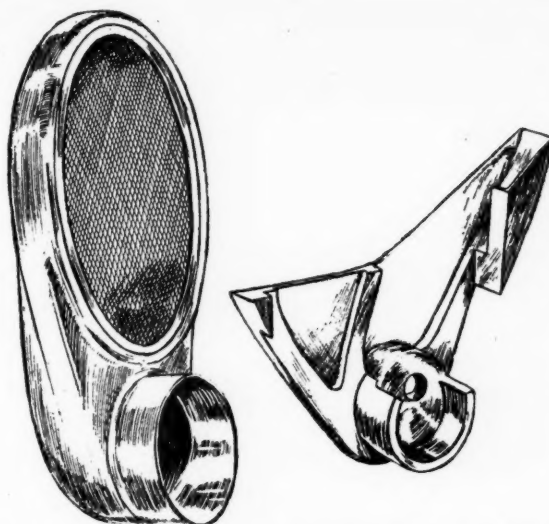


Fig. 17 (left)—Crankcase breather. Fig. 18 (right)—Oil scoop which fits to crank arm

As in the Zeppelin-Maybach engines, the efficient ventilation of the crankcase has received careful consideration. The design is, in fact, very similar in both types of engine. On the induction side of the engine six breathers are fitted; these are constructed of fairly coarse brass wire gauze baffles mounted in sheet aluminum breathers which are attached to short steel tubular connecting lugs screwed into the crankcase, and are fixed in position by steel wire clips. Details of the construction of these breathers are shown in the sketch, Fig. 17.

(To be continued)

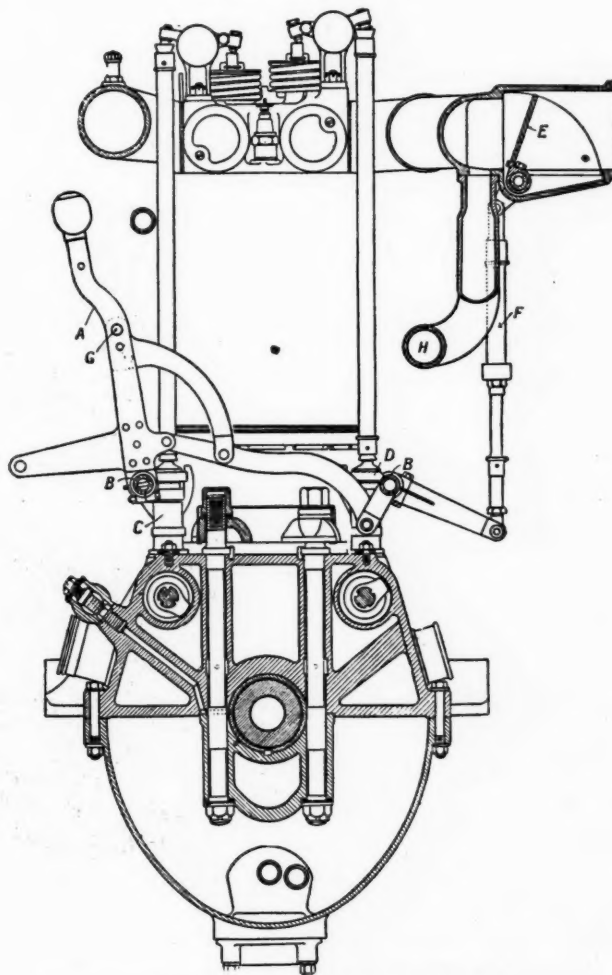


Fig. 18—Showing method of main bearing support

The Owen Automatic Lighting and Power Unit

Engine Started Automatically When Battery Charge Runs Low and Stopped When Charge Is Complete—Also Started When Load on Battery Exceeds Normal Discharge Rate—Load Circuit Opened When Load Is Excessive

By P. M. Heldt

A SELF-CONTAINED electric generating unit suitable for farms and country places is manufactured by R. M. Owen & Co., New York. It comprises a single cylinder, vertical gasoline engine, direct-connected to a four-pole electric generator; a 32-volt, 80-ampere-hour storage battery and a switchboard containing apparatus for the control of the system.

The feature of the system is its automatic control. When the battery charge, or discharge, reaches a certain predetermined value, the engine is started up automatically. When the battery is fully charged the engine is stopped automatically. If the engine stops for any reason, as, for instance, the fuel supply becoming exhausted, the battery current is shut off from the generator automatically. If an overload is thrown on the battery, the engine is automatically started up and takes care of the load up to the capacity of the generator, after which the battery also supplies power if the load requires it, but if there is not sufficient load to absorb the capacity of the generator, the surplus current is stored in the battery. In other words, the engine runs at its full load all the time it is running, and all the current used on the line goes direct to the line and not into the battery, but the surplus goes into the battery. If too much load is thrown on for the generator and battery combined, the load circuit will open automatically.

The gasoline engine is of interest because of the silent rotary valve which it employs. The engine is of 3-in. bore and 4-in. stroke and is governed to run at 1300 r.p.m. Its crank is formed on the end of the armature shaft, the crank pin being secured to the crank arm by a tapered fit and nut. The connecting-rod head is

solid and contains a cylindrical roller bearing. An aluminum alloy piston is employed, together with leak-proof piston rings.

Although the crank case is of very large volume, the up-and-down motion of the piston causes a variation in the pressure within the crank chamber, and as the latter is partly filled with oil, there is a tendency for the oil to be forced out with the outflow of air as the piston comes down, reducing the volume of the crank case and increasing the pressure therein. To prevent this a breathing device is provided on the circular plate closing the end of the crank case.

The silent valve is of the tapered type and is self-adjusting for wear and for differences in heat expansion. It is driven through a vertical shaft at one-quarter crankshaft speed. The shaft extends through the valve and near the upper end carries a quick-pitch screw engaging a corresponding female screw thread in a ring nut

screwed into the valve. A coiled torsion spring anchored to the timer disk on top of the valve shaft tends to screw the valve down on the shaft and onto the valve seat. On the other hand, the friction between the valve and the seat tends to screw the valve up on the shaft and out of the seat. By this arrangement two important advantages are secured. In the first place, if the valve expands more than its seat, as it naturally will when the engine heats up, the increased friction of the valve in the seat will cause the valve to unscrew or rise slightly in its seat, and thus relieve the friction. The general effect is to maintain a constant pressure between the valve and its seat, fixed by the setting of the spring. Secondly, as the valve and its seat wear,



Owen lighting and power unit for farms and country places. It comprises a single-cylinder upright engine with a rotary valve, an electric generator of 1250 watts output, and a switchboard which insures automatic control

the resulting looseness is automatically taken up by the spring. Of course, the spring force would become slightly less as the valve sank deeper into the seat, but the reduction would be negligible for ordinary wear, and, besides, if it should become necessary, the point of anchorage of the spring could be changed. The wear is said to be practically nil.

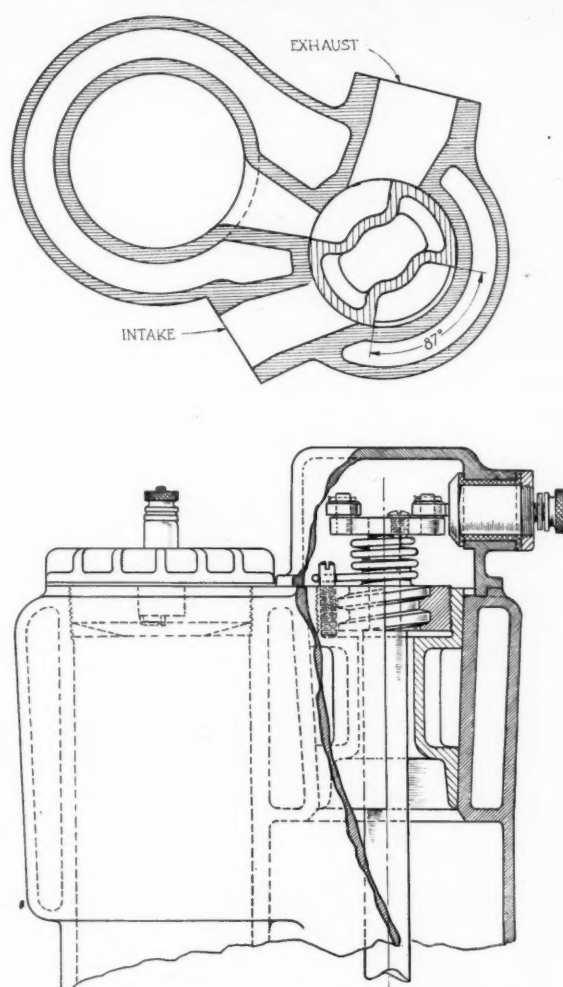
There are two wide, oppositely located ports in the valve. These do not extend through the valve, but are in the form of pockets which at the proper moment place in communication a passage from the cylinder, with the inlet port and then with the exhaust port in the valve seat. Thus, each port or pocket in the rotary valve serves alternately for the inlet and the exhaust. The result is that these ports are cooled by the incoming cool charge and the charge is raised in temperature, whereby the fuel is maintained in the gasified condition.

The oiling system of the whole outfit is automatic. A supply of oil is maintained in the engine crank chamber and is circulated by means of an eccentric pump located at the bottom of the vertical valve shaft. There is direct feed of oil to the long main bearing between the armature and the engine crank. This shaft is chambered out and a drilled passage leads from its oil pocket diagonally through the crank arm to the roller bearing on the crank pin. An oil delivery pipe runs up the side of the engine and divides into two branches, one branch leading to the valve pocket and the other to the outboard generator bearing. The rotating valve has an oil hole drilled at one point of its circumference near the top, and every time this oil hole registers with the oil hole in the valve seat, a small amount of oil is forced through it into the space above the valve. The valve, therefore, is always well oiled, and it is a noteworthy fact that in spite of this copious supply of lubricant to the valve, there is absolutely no smoky exhaust, except for an instant when first starting. Each bearing is provided with an oil return passage to the oil well. An oil gage at the side of the well indicates the amount of oil in the machine.

It will be noticed that the helical gear for operating the vertical valve shaft is located in a pocket formed at the middle of the main bearing and is therefore well taken care of as far as lubrication is concerned.

The carburetor is a Schebler, mounted adjacent to the valve pocket, with which it communicates through an inlet pipe containing a barrel type throttle valve. This throttle valve is acted on solely by a fly-ball governor mounted on the vertical valve shaft. The governor spring is located on top of the throttle valve and the governing speed can be quickly adjusted by means of a screw with check nut on top of the inlet pipe.

Ignition is by jump spark with current from the stor-



Horizontal section through cylinder and valve

age battery. The spark plug is screwed into the center of the air-cooled cylinder head, which latter in turn is screwed into the cylinder. A special form of timer has been evolved for this engine. On top of the valve shaft is mounted a steel disk which carries two oppositely located hardened steel rollers. These make contact with an insulated member secured into the side wall of the valve cover. There is a large glass window in the cover plate of the valve cover, so that the action of the timer and the feed of lubricant to the valve can be observed. Incidentally, the timer disk, which may be seen through this window, is the only moving part of the outfit that can be observed when the engine is running. Spark timing, of course, is fixed, but adjustments can be made by revolving the valve housing cover.

Cooling is by thermo-siphon circulation, and the cylinder jackets and connecting pipes are of large cross-section. The cellular radiator is a single iron casting, but as regards form, it comprises two parts, the lower circular in outline, behind which the cooling fan is mounted, and the upper of the general shape of a conventional automobile radiator.

The lower circular part conforms in diameter to the engine fly-wheel housing and a generator shield of perforated metal extends between the fly-wheel housing and a flange on the lower part of the radiator forming the fan housing. In order to permit of continued operation of the outfit without serious loss of water, a condenser designed for attachment to the wall at some distance above the radiator is connected to the top of the latter. This returns any loss by evaporation to the cooling system.

The engine fly-wheel is designed with fan-shaped spokes, and both the fly-wheel and the radiator fan draw air through the perforations of the generator shield, forcing it through ventilating holes in the engine housing and through the radiator respectively. The fly-wheel fan draws its air through the generator, thus helping to keep the latter cool.

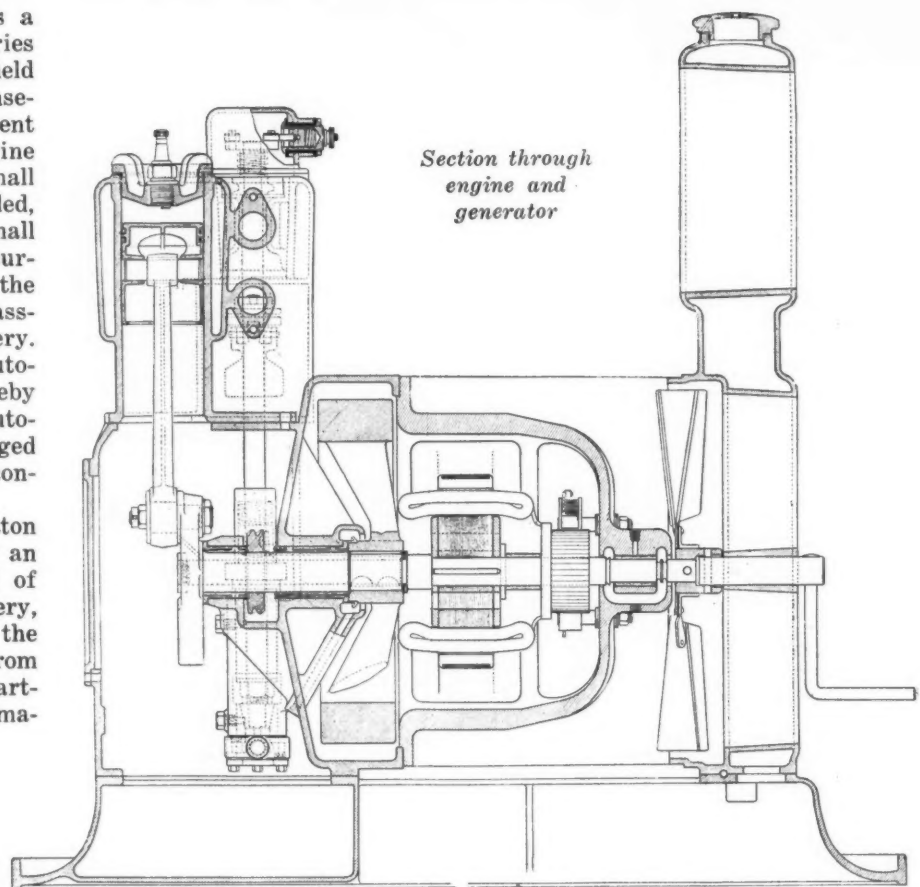
The generator is of the four-pole type, and carries four brushes. Its field frame is of cast iron, flanged outward at the engine end to join the fly-wheel bell-housing, and having the bearing bracket for the commutator end cast integral with it. This bearing, by the way, is supplied with oil through a special lead from the pressure oil pump. There is a knife-edge type of oil guard at each end of the bearing and a common return from the two oil guard grooves to the oil well.

There are three independent windings on the field poles of the generator, which, however, are formed and taped up into a single coil. One is the main shunt winding, another a small series winding serving to maintain the voltage constant, irrespective of the load on the generator, and the third is an additional series winding serving

only while the generator is used as a motor in starting up the engine. A series field winding gives a much stronger field in starting than a shunt winding, consequently the motor draws less current from the battery in starting the engine than it would if only the shunt and small compounding series coil were provided, thus protecting the battery. The small series coil, moreover, carries only current delivered by the generator to the lamp or other load and not current passing between the generator and battery.

What is known as the Strong automatic system of control is used, whereby the engine is started and stopped automatically to keep the battery charged and to take account of various other conditions.

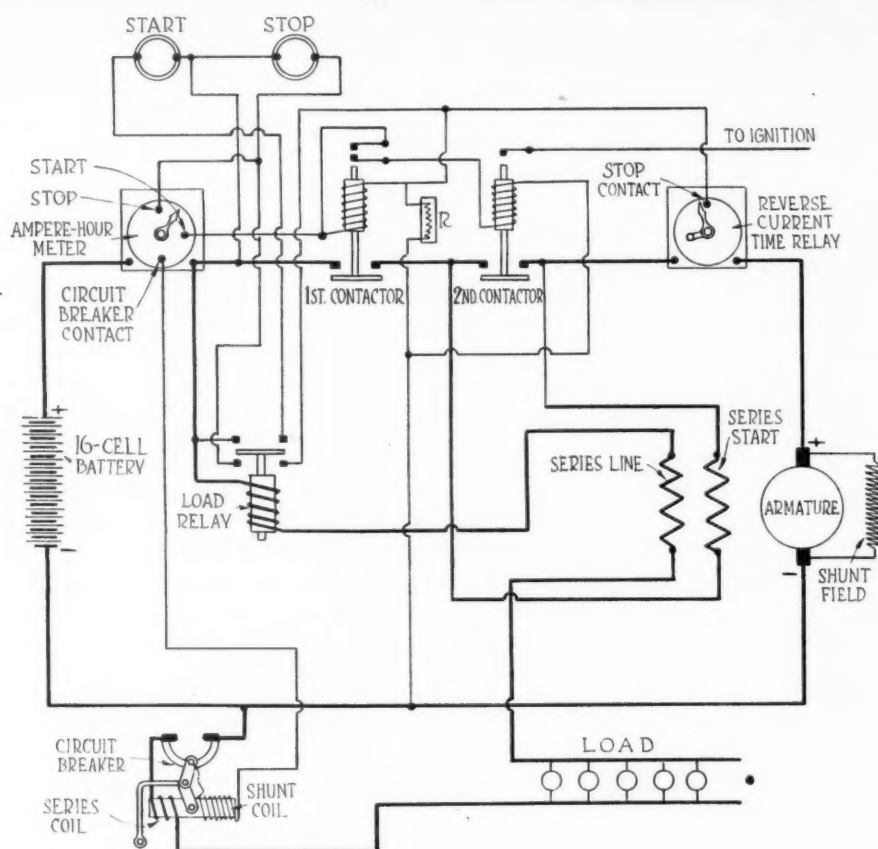
To first start the engine the button switch marked "Start" is pressed for an instant. This connects the solenoid of the "first contactor" across the battery, and this contactor, which is really the main switch, is closed. Current from the battery then flows through the starting series field winding and the arma-



Above—Valve and valve gear, carbureter, inlet pipe and governor. Below—Radiator and fan

ture of the generator, and the latter starts-up as a motor. The first contactor also controls the circuit of the second contactor, which latter cuts out the starting series field winding and closes the ignition circuit. Thus when the spark is turned on, the engine already has attained a considerable speed and the shock of the explosion on the bearings is reduced. As the generator increases in speed, its voltage surpasses that of the battery, and charging begins. It will be noticed from the wiring diagram that the compounding series field coil is so connected that only current flowing through the load (*i. e.*, lamps, motors, etc., connected to the outfit) passes through this coil. Included in this circuit is a so-called load relay which when the load on the battery exceeds the normal discharge rate of same, closes a switch connected in parallel with the starter button switch and thus starts the engine.

Two ampere-hour meters are included in the control system, one serving to start and stop the engine as the battery becomes nearly discharged and charged respectively, and the other to prevent running down the battery in cranking the engine, if the latter for any reason cannot pick up its cycle, as when there is no gasoline in the tank. Both charge and discharge currents pass through these meters and the meter hands revolve in opposite directions, according to the direction of current. But as the number of ampere-hours which it is possible to obtain from a battery during discharge is smaller than that which is sent into it during charge, a compensating device is incorporated in the meters which causes them to run faster for a certain discharge current than for the same charging current. The dial of the meters is not graduated in terms of ampere-hours, but in decimal fractions of the battery capacity. The meter hand of the charge and discharge meter serves as a switch lever making contact with contacts on the dial, the hand and



Circuit diagram of Strong automatic control

start contact forming a switch connected in parallel with the starting button switch. The start contact on the ampere-hour meter dial is adjustable and may be set to cause the starting circuit to be closed when the battery charge is down to 20 per cent, 30 per cent or any percentage desired. Thus when the battery charge is depleted to this extent, the engine is automatically started and charging begun.

As the charging proceeds the ampere-hour meter moves around in a left-hand direction, and when the battery is fully charged, it establishes contact with the stop contact on the meter dial. This action de-energizes the coil of the first contactor, causing it to open and thereby stop the engine and generator. The same effect can be produced by pushing on the stop button switch, this latter being connected in parallel with the stop contact on the ampere-hour meter hand and the stop contact on the reverse current meter.

The other ampere-hour meter or reverse current meter shown on the right in the diagram serves to prevent exhaustion of the battery in cranking when the engine won't start. The meter arm is held in place on the stem by means of a friction clutch which allows it to slip. All current flowing from the generator to the battery, and vice versa, passes through it. Ordinarily, while the battery is being charged, the hand is restrained by a stop and the stem slips inside its hub. When the generator draws current from the battery in cranking the engine, the meter hand revolves the opposite way, and if this continues for any length of time the hand comes to a stop contact on the dial, when it makes the same electrical connection as the stop button switch, disconnecting the generator from the battery.

Reference was made above to the load relay which starts up the engine as soon as more current is drawn from the battery than its normal discharge rate, and

as soon as the engine begins to fire, most, if not all, of the load, is shifted from the battery to the generator. One reason for starting up the engine as soon as considerable current is required is that it is more economical to supply this from the generator direct than through the intermediary of the storage battery. At light loads, on the other hand, say only four or five lamps, it is more economical to draw the current required from the battery, unless additional current can be used to advantage for charging.

It is conceivable that so much load be thrown on the circuit that the battery and generator connected in parallel cannot supply the necessary current without being overloaded. This contingency is provided against by means of an overload cut-out in the load circuit. All of the control mechanism is mounted on a switchboard located on top of the generator.

Compensation for variation in load is very effective. There is hardly a quiver in the voltmeter hand under variable lamp load. When the battery is fully charged, the outfit has a capacity sufficient to supply current to 100 20-watt lamps for 8 hours. When only a few lamps are being used, motors up to $1\frac{1}{4}$ hp. can be run by current from the set. The generating unit occupies $22\frac{1}{2} \times 32\frac{5}{8}$ in. floor space.

On Nov. 1 one of the sets was given a 1-hr. full-load test in the presence of the writer. The set delivered an output of substantially 1250 watts throughout the period of the test and ran smoothly from start to finish without signs of undue stress in any part.

South American Trade Mark Laws

Editor, AUTOMOTIVE INDUSTRIES:

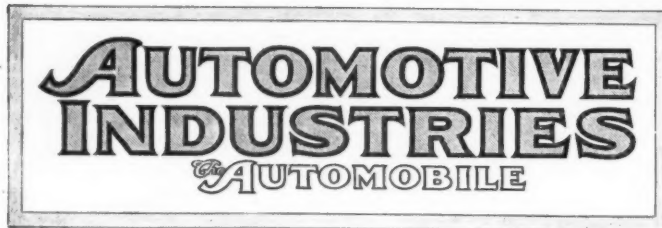
We have read with very considerable interest the article appearing in the issue of your paper, AUTOMOTIVE INDUSTRIES, of Aug. 1, 1918, regarding the Patent and Trade Mark Laws of the Argentine.

We may say we have already experienced the hardship of finding we are unable to sell our manufactures in the Argentine under our own trade name, which is well known throughout the world, due to the fact that the same name was registered by a firm of merchants in Buenos Aires prior to our entering that market, and although they have never utilized the name in connection with any articles of the class we manufacture, their action prevents us using our own name.

This same difficulty and extreme hardship has been experienced by many other firms in this country trading with the Argentine, and the matter has been before our Board of Trade and Chambers of Commerce in Glasgow and London on many occasions, but so far we regret with little effect, as there appears to be some difficulty in getting the Argentine authorities to move in the matter.

It appears to us, however, that if a joint representation was being put forward by the authorities in America and Great Britain and possibly including also our other allies at this time, very considerable pressure could be brought to bear on the Argentine Government to amend their trade mark law so that it would work out more equitably.

The great changes, both economical and political, which are bound to result as the outcome of the present war should offer a suitable opportunity for this matter being made a subject at least for negotiation.—"A British Motor Manufacturer."



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Effect of Aircraft Experience on Post-War Automobile Design

RECENTLY there has been considerable speculation as to the effect of aircraft engine experience on automobile engine design after the war. It is apparent that the aero engine marks a great advance over the automobile engine in point of weight efficiency, and it also greatly excels it as regards fuel efficiency. However, while both of these improvements would be very desirable in automobile engines, their realization in that type of engine would be a matter of great difficulty if not impossibility. There is one inherent difference between the conditions governing aircraft engine practice as we have known it during the past several years and those governing automobile practice. No commercial considerations have entered into the former and a slight improvement in performance was worth almost any increase in cost. In automobile work, however, commercial considerations are paramount. A certain gain in weight efficiency

or fuel efficiency is worth while only if it does not increase the manufacturing cost too much, and if we compare the price per horsepower paid for aviation engines with that paid for automobile engines before the war and bear in mind that this cost figure is naturally higher the smaller the engine, it becomes apparent that it will be next to impossible to apply the principles of design and manufacture of aero engines to the ordinary automobile engine.

What is more likely to take place is that a few companies catering to a select clientele who want something out of the ordinary and are willing to pay for it will adopt the aero type engine for automobile purposes. Lightness combined with high ability has always been a desideratum in automobiles, and the successful introduction of the aluminum engine before the war was based on this fact. The lightness of the aero engine is largely due to the use of steel for cylinders and the complete machining of all parts. It is quite possible that steel cylinders will be adopted for automobile work to a limited extent. In former years there would have been some prejudice against steel, owing to uncertainty of its wearing qualities, but the perfect satisfaction it has given in thousands of aero engines under all conditions has set all questions regarding its serviceability at rest.

Crankshaft and connecting rods were completely machined on some high priced automobiles even before the war and the lowest possible piston weight was aimed at by a great many designers. Methods of cutting down weight in machined parts have been further developed in airplane engine work and we may expect to see advantage of this being taken in automobile engine design during the coming years.

The Maybach Engine Article

WE wish to call attention to the description of the Maybach 300-hp. aircraft engine which was begun in AUTOMOTIVE INDUSTRIES of Oct. 31 and is continued this week. This was issued by the Technical Department of the British Ministry of Munitions and is probably the most detailed description of an aircraft engine ever published. The instalments of the article will continue through at least two more issues, the descriptive text being followed by a series of tables containing test results of different parts, analyses of materials employed in the construction of the engine and the weights of all individual parts.

Information of this sort cannot fail to be of great help in the further development of aircraft engines, and the British Aircraft Production Department is to be congratulated on the excellent character of the material it has issued from time to time.

Presumably the German papers have also had technical descriptions of the newer allied engines, and we have heard it said that a many-page description of the Liberty engine appeared in one of them. However, no German papers are available in this country at present and the English papers, which continually carry abstracts or translations from German aircraft papers, have not mentioned it.

Necessary Aircraft Waste

WHILE so very much has been written and so very much more said, regarding the delays and failures in the U. S. aviation program, little has been heard of the actual working out of aviation problems in France and England.

As yet it is not possible to give any detailed information of failures on the part of our allies, but it may be said and should be made clear that all has not run smoothly on the other side of the water.

A moment's thought shows that with so new a thing as aviation, programs could not be written down and followed up like a program for motor vehicles or typewriters. It is stated, and stated truly, that much time has been wasted in deciding what types of planes to make. It has, but these decisions are not reached much more quickly in Europe. The record of experiments which have never come to anything in England, in France and even in Germany, would fill a large volume.

How could it be otherwise? The airplane at the outbreak of war was but a toy compared to what it is to-day. It has been improved out of all recognition by experimentation of the most daring kind, by the trying out of things which in more sober times have been regarded as barely sane.

It has been worth while to make twenty costly experiments if only one of them produces results. America's fault has been on the other side; America could have permitted *more* experiment.

At the very beginning of the program there was a widespread misconception—this being an almost universal idea—that France and England knew all about airplanes; that all the facts of the case could be found by consultation with French and British engineers.

There *were* no facts and there are no *facts* to-day. Not facts in the usual sense of the word.

A fact about the design of a plane is hardly ever more than a probability. Something accepted as basic to-day is reconsidered to-morrow and abandoned the day after.

Germany experimented less than France and England, especially in engine design. The result was that for a time German output of medium good machines was large, and though the Allies had some better planes they lacked the necessary quantity, but to-day, and for the past six months the very great superiority of Allied machines has told its tale.

England and France have not hesitated to put to use small numbers of experimental planes that looked good, have been content to order small numbers at a time.

This has delayed output, has led to the employment of a multiplicity of types but has had the highly desirable result of constantly putting over a surprise on the enemy.

If there had been a little more faith placed in American brains we would have had a fair number of fighting machines available last April; they would have been a mixed lot but they would have accounted for at least an equal number of Germans.

It is easy to be wise after the event of course, but the moral is that the British and French supremacy of the air has been won by permitting failures and, in a sense, "waste."

The time is very close at hand when the problem will be before us of turning to peaceful usage the vast amount of knowledge of aircraft we now possess. Let it be remembered that the airplane even now is no more ready for quantity production commercially than was the automobile of fifteen years ago. All is before us.

The Hughes report touches only upon production and gives no attention to the fact that the great, the enormous difficulty, has not been *production* but *decision*. The responsibility for choosing this or that design has been a burden, the weight of which will probably never be appreciated except by those who had to bear it.

□ Latest News of the

Maxwell Earnings \$2,158,836

Net Surplus Reduced Considerably But No Estimate of War Work Profits Is Made

MAXWELL REPORT

Assets		
	1918	1917
Real estate, machinery and equipment	\$9,183,843	\$5,846,738
Good-will, patents, etc.	25,224,108	25,457,363
Inventories	16,283,389	10,813,430
Advance to Chalmers	2,398,115	.....
London office, net assets	65,837	.....
Interest receipts, government contracts ..	115,485	.....
Accounts receivable	2,611,567	1,395,742
Notes receivable	879,715	706,952
Liberty bonds	773,750	175,180
Cash	2,869,937	1,852,305
Sight drafts	1,783,190	2,946,384
Insurance and taxes ..	119,405	.....
Sinking fund	10,723	350,185
Total	\$62,419,064	\$50,804,146
Liabilities		
	1918	1917
First preferred	\$13,336,642	\$13,915,142
Second preferred	10,127,468	10,127,468
Common	12,805,157	12,778,058
Mortgages and land contracts	168,381	.....
U. S. Government advances	5,614,944	.....
Dividend warrants	466,782	.....
Plant construction .....	.....	172,018
Notes payable	4,160,000	.....
Accounts payable	2,334,124	2,878,430
Wages, taxes, interest ..	500,149	399,827
Customers' deposits ..	419,069	418,526
Due on contracts .....	.....	643,913
Liberty bond subscriptions ..	209,543	197,000
Notes receivable, discounted	206,844	.....
Drafts discounted	951,935	1,071,320
Reserve for depreciation ..	2,333,377	.....
Reserve for doubtful accounts	157,524	.....
Reserve for contingencies ..	60,000	185,000
Deferred liabilities	8,567,125	8,017,444
Surplus .....	.....	.....
Total	\$62,419,064	\$50,804,146

DETROIT, Nov. 2—An analysis of the annual report of the Maxwell Motor Car Co. for the year ending July 31, 1918, in comparison with that for 1917, shows that the total assets for the present year amount to \$62,419,064, as against a total of \$50,804,146 for last year. The net surplus after deduction of charges is \$2,158,836, a sum which is equivalent to \$4.82 per share of common stock after 7 per cent on the first and 6 per cent on the second preferred stock have been deducted. In 1917 the company earned \$29.63 a share on the common stock.

Real estate, machinery and equipment are valued considerably higher than was the case in 1917, and inventories have increased by \$5,468,959. An advance to the Chalmers company is represented by an amount of \$2,398,115 and the accounts receivable are nearly double last year's

figure. Good will and patents are at a slightly lower figure and the cash item is over \$1,000,000 greater than last year's item.

On the liabilities side there is an item of \$2,333,377 reserved for depreciation, whereas last year no provision was made under this head. Government advances of \$5,614,944 constitute another item which had no counterpart in 1917 and a substantial reserve is now made for doubtful debts. The surplus brought from last year's report is \$8,017,444, and this year's total income is \$3,163,334.

The company is co-operating to the fullest possible extent with the Government in carrying out its war program, and this has caused a substantial curtailment in the production of passenger cars. As the fiscal year closed approximately 80 per cent of the total Maxwell capacity was engaged on war work and the remaining 20 per cent was available for passenger cars.

According to President W. L. Mitchell, it is impossible to estimate the probable profits from war contracts until the work is more nearly completed.

Smith Motor Truck Sold

CHICAGO, Nov. 6—The business of the Smith Motor Truck Corp. was sold yesterday under the sheriff's hammer to a man named John Campbell. The sale wipes out the old indebtedness under which the company has been staggering and carries with it control of the name, good will, factory and material equipment of the corporation. It is generally surmised that Campbell represents one of the factions, or a coalition of factions, from among those which have been struggling for control of the company for the last two years or so. Whether the sale will result in a reorganization of the company and a resumption of business no one seems to know. A man who always has been close to the inside affairs of the company ventures the surmise that Campbell represents interests closely allied personally with the Central Bond & Mortgage Co. of this city. He concludes, furthermore, should this prove to be the case, that there is a probability of the men who first put the Smith Form-A-Truck on the map regaining control and attempting a rehabilitation of the business.

Gordon Heads Selden Sales

ROCHESTER, Nov. 7—George R. Gordon was elected president of the Selden Truck Sales Co. at the annual meeting of the company, other officers elected being: Vice-presidents, Wm. C. Barry, R. H. Salmons, H. T. Boulden and W. F. Reynolds; secretary, E. B. Osborn; treasurer, F. J. Kolb. H. G. Strong and C. H. Stearns were elected directors.

Conference Modifies Tractor Position

Restrictions on Production Have Been Partially Removed by
Priorities Division

CHICAGO, Nov. 6—As a result of conferences between the War Service Committee of the newly organized American Tractor Association made up of the newer companies and the Priorities Division of the War Industries Board the following modifications have been made in the restriction on tractor production:

First—Tractor makers who, in the period from Oct. 1, 1917, to Oct. 1, 1918, had not received or placed bona fide orders for parts and materials, will be allowed to make a maximum of twenty tractors in the year ending Oct. 1, 1919.

Second—Tractor makers who, in the period Oct. 1, 1917, to Oct. 1, 1918, made less than ten tractors, and prior to Nov. 1, 1918, had in hand or had placed bona fide orders for materials and parts, will be allowed to use up such materials in the manufacture of tractors up to a total not exceeding one hundred machines by Oct. 1, 1919.

The War Service Committee has been recognized officially by the Priorities Division and has been promised further reconsideration with a view to letting down the bars on tractor production to the extent that conditions may make advisable. The association believes that, in view of the present war situation, the modifications mean tractor makers will be able to go ahead with their production plans in almost absolute certainty that before they have exhausted their allotment of materials they will receive permission to go ahead with their production programs without limitation.

3878 Liberties in October

WASHINGTON, Nov. 4—Three thousand eight hundred seventy-eight Liberty engines were produced in October as compared with 2378 in September, an increase of 1500. This increased production was made despite influenza, which threatened to hamper the output of the various factories. The quota set for September was 2500 engines and the actual number shipped was 2378. The quota set for October was 3000. The competition among the various factories has now become a race with each concern showing keen interest. The Nordyke & Marmion Co. of Indianapolis won the October pennant, which was sent to the factory in a DeHaviland Liberty plane from Detroit to-day. The quota of Liberty engines set for November is 4350.

Automotive Industries



Liberty Pennant for Marmon

Presented With Production Championship—Bettered October Quota by 246%

INDIANAPOLIS, Nov. 2—The Nordyke & Marmon factory won the Liberty engine production championship pennant for the month of October by turning out 308 airplane engines during the month. This was 246 per cent of its quota of 125. Five large concerns building Liberty engines entered into a competition Oct. 1 for an honor flag to be competed for each month, the flag to be awarded at the end of the month to the factory which produced the greatest percentage over its quota for the month. The factories in competition, aside from the Indianapolis concern, are the Lincoln Motors Co., General Motors Co., including Buick and Cadillac, Ford Motor Co. and Packard Motor Co.

By producing over twice its quota for the month, Nordyke & Marmon is awarded the championship pennant for the first month. This is to be held until some of the other factories show a greater percentage increase than Marmon for some month. This does not mean that the Indianapolis concern produced more engines than any others during the month, for some of the other builders had much larger production but a much larger quota.

Liberty engine builders altogether shipped 3878 engines during October, 878 more than the quota and 1500 more than the September shipment. November's quota calls for shipment of 4350 engines. Detailed production quotas of the five concerns are shown in the table herewith.

Award of the first championship pennant by the Bureau of Aircraft Production to the Marmon factory was made the occasion for a parade of Marmon workers, and a general celebration in Indianapolis this afternoon. The parade was over a mile and a half in length, comprising more than 4500 employees of the plant, through the streets of the city and to a park, where the raising of the championship pennant unveiled a Liberty engine. The active heads of Liberty engine production made inspirational talks to the employees. Among the speakers were Archer A. Landon, chief of production, Bureau of Aircraft Production, assistant to John D. Ryan, head of the aircraft activity; Lieut. Harold H. Emmons, of the Navy, chief of the engine production department, Bureau of Aircraft Production, and Major James G. Heaslet, Detroit district manager of the bureau.

Other notables in the aircraft production were present. Lieut.-Col. Jesse G. Vincent and Ralph De Palma flew over from Detroit. Major Marmon, of McCook Field; Mr. Kettering and Mr. Talbot, of Delco; Major Johnson, Bureau of Aircraft Production, and others, were present.

Liberty Engine Quotas

Company	September		October		November Quota
	Quota	Shipped	Quota	Shipped	
Nordyke & Marmon Co.	100	59	125	308	375
Lincoln Motors Co.	850	687	825	1,050	1,125
General Motors Co.					
Buick & Cadillac Co.	450	193	325	558	600
Ford Motor Co.	800	811	900	1,059	1,375
Packard Motor Co.	800	628	825	903	875
Totals	3,000	2,378	3,000	3,878	4,350

Mail Motor Trucks Prove a Success

WASHINGTON, Nov. 4—Cross country operation of mail motor trucks is proving very successful, according to James I. Blakeslee, Fourth Assistant Postmaster General. One truck route between Washington and Philadelphia without direct rail connections and costing \$800 monthly for operation has in 8 months paid a monthly revenue of \$16,000. Another route into Washington where 28 parcels daily were moved in the first month now shows a ton of traffic each way in every 24 hr. Seventy lines now operate over the country, all but one being east of the Mississippi River, and plans are being made for a complete system that brings up visions of \$360,000,000 yearly revenue, this amount being estimated provided the entire country is once properly established with a network of roads and truck routes.

Mr. Blakeslee plans to rebuild the thousands of Army trucks now in France after the war and to utilize these also for this work.

Nine million dollars has been asked of Congress for next year's appropriations for the development of the mail truck routes. Three hundred thousand dollars was allowed this year. Even this small amount, if it could be combined with the revenue that would accrue from the establishment of the routes, would be sufficient. However, it is expected that the revenue will continue to be diverted to the general Post Office funds and that instead Congress will pass the \$9,000,000 appropriation.

Dorris Truck Price Advanced

ST. LOUIS, Nov. 4—The Dorris Motor Car Co. announces a new price on two-ton trucks, effective Nov. 1, of \$3,425. This is an advance of \$440.

Would Cut Out Taxes On Exports

Amendment Eliminates Impost Now Collected on Vehicles Sent Abroad

NEW YORK, Nov. 7—It seems likely that the War Revenue tax imposed on cars for export will be eliminated. Under the terms of an amendment which has been proposed as an addition to the War Revenue measure now in the hands of the Senate and the House of Representatives, it is stated that vehicles sold or leased for export shall not be taxed.

Despite the fact that the Constitution specifically states that there shall be no tax on exports, the Treasury Department has ruled that cars and trucks sold for export are taxable under the provisions of the present War Revenue measure, which provides an impost of 3 per cent. The Treasury Department has ruled that such a tax must be paid when cars or trucks are exported in any one of four ways which have been previously outlined in AUTOMOTIVE INDUSTRIES.

The National Automobile Chamber of Commerce has repeatedly pointed out the unconstitutionality of such a ruling and has urged that the tax on vehicles exported be eliminated. It seems likely now that this will be done. Under the terms of the new War Revenue Bill in the House, vehicles are taxed 10 per cent and in the bill in the hands of the Senate, the tax is 5 per cent. Following is the text of the proposed amendment:

"Under such rules and regulations as the Commissioner, with the approval of the Secretary, may prescribe, a tax imposed under this title shall not apply in any respect to articles sold or leased for export, and in due course so exported."

Consider Deeds Court-Martial

WASHINGTON, Nov. 6—The suggestions by Charles E. Hughes recommending court-martial for Col. E. A. Deeds and other officers mentioned were referred by Secretary of War Newton D. Baker to the Judge Advocate General of the Army yesterday for consideration and report. Mr. Baker stated also that he is reading the report carefully so as to be able to have the entire question in mind when any action is taken.

Col. Deeds and Gen. Squier and some of the other officers whose names have been mentioned have already asked for a court of inquiry. Ordinarily such requests are granted to determine if there is ground for a court-martial.

Working Conditions Standardized

Department of Labor Creates Three Service Divisions to Establish Uniformity

WASHINGTON, Nov. 4.—The Working Conditions Service has been established in the Department of Labor to construct uniform standards for working conditions in all industries. For administrative purposes there are three divisions in the Service—(1) Division of Industrial Hygiene and Medicine; (2) Division of Labor Administration; and (3) Division of Safety Engineering. Since there are in operation other agencies with the specialized function of dealing with wages and hours as controversial questions between employers and employed, they will not be dealt with as such by this Service.

The Secretary of Labor at the request of the Working Conditions Service requested the Secretary of the Treasury to authorize the United States Public Health Service to detail personnel to the Division of Industrial Hygiene and Medicine of the Service. As a result of the agreement reached, Dr. A. J. Lanza, Past Assistant Surgeon of the Public Health Service, was detailed to act as Chief, Division of Industrial Hygiene and Medicine, Working Conditions Service. Dr. G. D. Selby, of Toledo, Ohio, will be at the head of the section of Industrial Medicine.

The Division of Industrial Hygiene and Medicine will direct the formulation of sanitary and health codes for industries. Co-operation with the United States Public Health Service will make possible extensive research work necessary to establish fundamental scientific principles as the basis for proper working conditions.

In addition to the work which the United States Public Health Service will perform for the Working Conditions Service, it is also authorized to do all inspections and investigations into matters pertaining to the sanitation of plants engaged on war work and into the health of workers in such industries, and into the sanitation and housing conditions surrounding the homes of war workers. In addition, the Ordnance Department of the War Department has delegated it the responsibility for mechanical safety in ordnance plants.

A field force of specialists in industrial hygiene, sanitation, safety and production engineering, technically trained and of broad practical experience, has been organized which will be under the supervision of Bernard J. Newman.

The Division of Labor Administration will deal with the attitude and policies of the management toward the employed and the personal relations between employers and employed. The chief of this section will be Dr. William M. Leiserson of Toledo, Ohio.

The Division of Safety Engineering completes the Working Conditions Service. Standards for mechanical safety

have been more adequately worked out than standards for sanitation and industrial hygiene. There are now in nearly all of the states of the Union safety codes and agencies charged with the establishment and maintenance of industrial safety. Supplementing Government agencies, the great energizing forces in this field have been the National Safety Council and various technical societies.

The policy of the Working Conditions Service is to avoid duplication of work and activity and, by acting as a co-ordinating agency, co-operate with the forces already in the field to bring federal directing impetus in the national campaign for uniformity of safety standards, practices and equipment standardization of safety organizations, and for the collection of data necessary for the continuous modification of standards to meet new conditions.

The Bureau of Standards has offered its co-operation in the formulation of codes. The assistance of the National Safety Council has agreed to co-operate with the Working Conditions Service and appointed a committee of five for consultation and advice. The codes which are to be worked out under the Division of Safety Engineering will be the result of experience and experimentation, consultation with technical organizations and conferences with employers and employees in order to ascertain the necessary practical modifications.

The Director of the Working Conditions Service is Grant Hamilton and the Assistant Director is Florence C. Thorne.

Priority for Gasoline and Kerosene

WASHINGTON, Nov. 2.—Priority has been ordered by the Fuel Administration for gasoline and kerosene for shipments to the armies abroad. All producers of kerosene and gasoline have been notified that whenever they have orders both for civilian and war purposes they must give preference to the war business and will not be allowed to supply civilian requirements until all the military demands are first met. Following is the order issued by the Fuel Administration:

"No licensee engaged in the business of manufacturing kerosene or gasoline shall, without the consent of the United States Fuel Administration, make any deliveries of kerosene or gasoline to any customer or consumer, whether the licensee is under any contract to make delivery to such consumer or customer or not, if such licensee shall be in default in delivering kerosene or gasoline which such licensee may be from time to time directed by the United States Fuel Administrator to deliver for export for the United States Army or Navy or for the Allies."

No Tractor Show at Phoenix

PHOENIX, ARIZ., Nov. 4.—Owing to the prevalence of Spanish influenza, the State fair, which was scheduled to open Nov. 11, has been called off. It was planned to have a tractor exhibition and demonstration in connection with the fair and a number of entries were already secured from tractor concerns.

200,000 Men Needed for Motor Corps

Highways Transport Committee to Assist in Recruiting—Women May Be Enlisted

WASHINGTON, Nov. 2.—The task of assisting in recruiting men for the Motor Transport Corps of the Army, which is now being organized along such comprehensive lines as to call for a force approximating 200,000 men and for motor transportation of the value of \$130,000,000 in addition to the value of such transport already in the service, has been assigned to the Highways Transport Committee, Council of National Defense, by General C. B. Drake, Chief of the Motor Transport Corps.

The carrying out of this assignment for one of the great branches of the war machinery means that the whole organization of the Highways Transport Committee, including the regional directors, the committees organized on its behalf by the State Councils of Defense throughout the country, and their local committees, will be given an increased share in the vital task of winning the war.

In order to prevent the disruption which would follow if tens of thousands of skilled men were taken away from the great organization engaged in operating and maintaining the industrial transport service of the country, and at the same time to provide an adequate force, it is necessary to work out for the Motor Transport Corps some plan to secure substitutes for those thus taken away.

May Recruit Women

One way of meeting this situation is by substituting women therefore for men, which involves recruiting these women and placing them in training for service while the men in the industry are being withdrawn for army purposes.

The problem which would inevitably develop in carrying out this plan of substituting women for men in the handling of industrial vehicles over the highways would include a determination of how many men in a given locality are employed on types of vehicle which might be adapted to handling by women, and, again, the adaption of the service of such vehicles so as to provide a satisfactory environment for female operatives.

The possible selection and training of women to take the place of men in the handling of various kinds of highways transportation, and simultaneously the selection and training of men whose age makes them unavailable for army service, will be conducted on the basis that these people are volunteers in much the same sense as are those who are entering the Army. In satisfactorily handling domestic transportation problems, which are necessary to the health and comfort of the civilian army in this country as well as an essential link in the trans-

portation system which supplies our war industries and the Army overseas, these volunteers will be doing their bit in a big way.

Pedestrian, Too, Has Rights

BOSTON, Nov. 2—The full bench of the Massachusetts Supreme Court has just decided that pedestrians have a right in the street, according to a decision just handed down in an automobile case. George G. Miller was driving his car through Reading one night about 10 o'clock. The sidewalk was muddy and so two girls stepped out into the street and were walking there. While getting out of the way of an approaching electric car they were hit by Miller's motor car, which was on the way to Boston from Haverhill. At the time he was engaged in war work. At the trial the testimony showed that he was driving a 56 hp. touring car at a speed of from 35 to 40 miles an hour, although he claimed that his speed was only 20 miles. The two girls were badly injured, one getting a fractured skull and the other a broken leg after being carried 80 ft. by the car.

Judge John F. Brown, of the Superior Court, ruled that the young women were not exercising due care and he directed a verdict for Miller. The attorney for the young women filed exceptions and took the case to the Supreme Court. Chief Justice Rugg, in writing the opinion, said:

There can be no question that there was sufficient evidence of negligence on the part of the defendant Miller. He was violating statute 1909, chapter 534, sections 14 and 16. The speed at which he was driving might have been found to have been excessive and dangerous to other travelers. If the defendant had been traveling at a lawful rate of speed the young women would have reached a place of safety. Even if they did not pursue the wisest course in the light of what happened, that is not decisive against them.

The chief justice further added that the rights of an automobile driven in a public way are not superior to those of a pedestrian. This point will have an important bearing in many suits for damages in the future, for many motorists have contended that motor cars had the right of way on the thoroughfares except at cross-walks, etc.

Boston Show Out of Question

BOSTON, Nov. 2—If the Boston Automobile Dealers' Association decided to hold a motor show next spring its plans would have to be altered now, for the officials of Tufts College have taken over Mechanics' Building as a barracks for the students who are training in its officers unit. And this unit will be held at the college during the regular college season, so that the barracks being part of the Government scheme of training any lease of the building for motor show purposes would have little consideration. As there is no other building in Boston suitable for a show it would not be possible now to have one.

Non-War Industries Power Curtailed

Factories Using More Than 100-Hp. Electrical Energy to Be Affected

WASHINGTON, Nov. 2—Non-war industries using more than 100 hp. connected load of electric energy from light or power companies will be curtailed in their use of this power by new regulations from the War Industries Board.

Preference will be given to consumers of more than 100 hp. connected load who are engaged in war manufactures and who will be placed in class 1. Consumers using 100 hp. connected load or less will also be placed in class 1, as it has been found that the inconvenience and damage they would suffer by curtailment would not be justified. Other industries not engaged in war work will be placed in class 2, 3 and 4, depending upon the importance of their products, and they will be rationed by the use of the following formula:

Formula for Rationing

- (a) The aggregate kilowatt demands of each of the four classes of all industries and plants shall be approximately ascertained.
- (b) The available supply of electric energy shall be ascertained.
- (c) Should the available supply equal the requirements or demands, then the requirements of all industries and plants on the preference list shall be fully satisfied.
- (d) But should the requirements or demands exceed the available supply of electric energy, then there shall be deducted from such supply the requirements of Class 1, 100 per cent of which must be delivered, and the remainder shall be prorated between Classes 2, 3 and 4, giving to each a per cent of its requirements in the ratio of 5, 3 and 2.

It will, however, sometimes happen, when class 2 or 3, or both, have extremely small requirements in proportion to the total requirements of the district that the formula will allot to one or both of these classes (2 and 3) an amount in excess of their respective requirements. In such a case the over-allotted class or classes should be given 100 per cent of their requirements and the balance of their allotment under the formula should be distributed either:

- (a) Between the classes given incomplete service by the formula, in the ratio of their respective priority ratio (5, 3 or 2). This procedure is to apply where two classes are left incompletely served, or
- (b) If only one class is left incompletely served by the formula, the over-allotments of the other two classes are to be assigned to the incompletely served class.

The allotment of more than 100 per cent under the formula to a small class of high importance shows that the shortage in the district was primarily caused by the large amount of less important work in the district, and that the small class or classes of higher importance should not be penalized, since they are not responsible for the shortage.

It is not practicable, and it is not intended, that an attempt should be made to apply this formula with literal and mathematical accuracy, but it will afford a workable basis for rationing industries and plants embraced within classes 2, 3 and 4, where the available supply, after satisfying class 1, is less than their aggregate requirements or demands.

Consider Massachusetts Taxes

BOSTON, Nov. 4—The commission comprising the three members of the Highway Board, Col. William D. Schier, Frank D. Kemp and James W. Synan, and Secretary of State Albert P. Langtry, with Thomas W. White, supervisor of administration, appointed to delve into motor laws and report to the next legislature, have picked out Thursday, Nov. 7, for the first hearing. Letters have been sent to all the prominent motor dealers in Boston and a general invitation is extended to motorists, accessory men and others interested in the industry to attend and air their views. The committee hopes to get enough material together to frame such laws that will do away with the necessity of fighting before legislative committees year after year, as has been done in the past. While motor fees will be considered they will not be so important because of the fees and taxes of the National Government. But headlights, the weight of trucks and other topics will get consideration.

President John H. MacAlman, of the Boston Automobile Dealers' Association, will represent the motor car dealers; John H. Johnson will represent the N. A. A. D.; Josiah S. Hathaway will represent the Boston Commercial Vehicle Dealers' Association; George H. Hudson will speak for the electric vehicle men; James T. Sullivan will appear for the Bay State A. A.; Secretary James Fortesque will voice the sentiment of the Massachusetts State A. A., and it is expected that representatives of other organizations throughout the State will attend.

It is the intention of the committee to have several hearings if necessary so that everyone will have a chance to be heard. Later on the committee may sit at Springfield and Pittsfield to give men in the other part of the State a chance to be heard who cannot come to Boston.

One Death at Aviation Fields

WASHINGTON, Nov. 2—There was but one death due to training flyers reported from American flying fields during the week ending Oct. 26. This fatality occurred at Park Field, Millington, Tenn. There were no deaths due to aviation accidents reported from any of the other 26 flying fields in the United States. The total flying time at aviation fields in this country during the week ending Oct. 26 was 14,779 hours in the air. The distance covered by all flyers at the 27 fields was 1,182,320 miles, a distance over 47 times around the earth.

September Exports Satisfactory

Over 11% Better Than Those of August and Slightly in Excess of September, 1917

1918					
Cars	Value	Tr'ks	Value	Parts	
Sept. 3,305	\$2,593,236	1,280	\$3,215,206	\$3,441,758	
Aug. 2,710	2,818,259	909	2,337,904	3,072,756	

1917					
Sept. 4,038	3,432,290	1,314	3,903,067	1,802,051	

WASHINGTON, Nov. 6—Although during the month of September, 1918, we exported a greater number of passenger cars than during the previous month, the value was appreciably less, but this falling off in value was more than compensated for by the considerable increase in both the number and value of trucks exported. Automotive parts also showed a gain during September, with the result that the month's totals representing the value of trucks, cars and parts showed an increase of 11.2 per cent over the corresponding items for August. In comparison with September, 1917, a slight increase in value is shown, the gain in parts alone being more than sufficient to compensate for the drop in cars and trucks.

Taking the nine months ending September the present year shows a falling off in values of cars, trucks and parts of \$10,961,715 when compared with a similar period of 1917, the sole item showing an increase being that of parts.

During this period the various types of engines exported show a very substantial gain, this being especially evident in the case of tractor engines which are used in military service.

The United Kingdom and France continue to absorb the great majority of the trucks exported, but there are indications of increasing demand for commercial vehicles from the Latin American republics, many of which are included under the head of "other countries."

Bituminous Production Drops

WASHINGTON, Nov. 5—Bituminous coal production for the week ended October 26 was 11,215,000 tons, a decrease of 309,000 tons over the preceding week, due, according to the Fuel Administration, to the influenza epidemic. This production, however, is an increase of 411,000 tons over the corresponding week of 1917. Anthracite production for the week ended October 25 was 1,714,000 tons, a decrease of 339,000 as compared with the corresponding week of 1917. In the week ended October 19 the total loss by all causes from 100 per cent production was 20.6 per cent, of which car shortage comprised 7.6 per cent, labor shortage 8.5 per cent, mine disability 3 per cent and all other causes 1.5 per cent.

Inland Piston Ring in Larger Premises

ST. LOUIS, Nov. 4—The Inland Machine Co., makers of the Inland one-piece piston ring, has made its third move in two years to larger and better quarters. It is now in the Advertising Building at 17th and Locust Streets, having the first floor and basement.

Implement Dealers to Convene

Expect 1200 at Combined Three-Day Meeting and Exhibition in Omaha, Nov. 13-15

OMAHA, Nov. 6—All display space is already sold out for the tenth annual convention of the Midwest Retail Implement Dealers' Association, which meets here Nov. 13, 14 and 15. Twelve hundred dealers are expected to attend the three-days session. Headquarters of the convention are at the Hotel Rome, with displays occupying the entire space at the Auditorium. The main floor of the Auditorium will be taken up by exhibits of farm implements and equipment, while tractors will be shown in the basement. Trucks and farm lighting systems will also comprise an important part of the displays.

The Program

The program will comprise regular morning and afternoon sessions, at which men prominent in the implement truck and tractor trade from a wide section of the country will be speakers. Questions arising from advancing cost and restrictions of material and curtailment of output by war demands on manufacturing resources will feature the business sessions. Among the speakers will be Floyd R. Todd of Moline, Ill., vice-president of the John Deere Plow Co., who will represent the National Implement and Vehicle Dealers' Association

Exports of Automotive Equipment for September and Eight Previous Months

	Month of September				Nine Months Ending September, 1918			
	1918		1917		1918		1917	
	No.	Value	No.	Value	No.	Value	No.	Value
Airplanes	13	\$197,700	1	\$4,000	28	\$417,455	138	\$1,065,707
Airplane parts		1,111,607		371,778		10,371,948		3,049,714
Commercial cars	1,280	3,215,206	1,314	3,903,067	7,967	19,258,345	10,817	27,202,010
Motorcycles	418	93,775	765	148,451	7,446	1,732,468	11,939	2,507,147
Passenger cars	3,305	2,593,236	4,038	3,432,290	32,048	29,616,551	48,767	37,090,838
Parts, not including engines and tires		3,441,758		1,802,051		25,548,133		21,091,926
Total (trucks, cars and parts value only)		\$9,250,200		\$9,137,408		\$74,423,029		\$85,384,774
ENGINES								
Automobile gas	1,275	\$231,725	1,204	\$144,490	23,024	\$3,081,984	24,392	\$1,762,070
Marine gas	426	153,319	907	17,225	4,040	2,001,715	8,255	1,594,099
Stationary gas	2,900	271,538	1,482	163,405	21,468	2,498,010	21,072	2,420,926
Tractor gas	2,339	2,754,360	1,323	2,089,227	19,728	20,598,312	8,423	11,287,734
Total value		\$3,410,942		\$2,569,347		\$28,171,021		\$18,064,829

EXPORTS BY COUNTRIES SEPTEMBER, 1918

		Passenger Cars		Trucks	
	No.	Value	No.	Value	
Argentina	81	\$69,675			
Australia	198	210,118			
British India					
British South Africa	50	40,927	196	\$244,967	
Canada	1,001	223,912			
Chile	280	317,998			
Cuba	134	196,701	63	117,216	
Denmark					
Dutch East Indies	145	163,344			
France	74	35,900	408	1,312,450	
Mexico	168	167,632			
New Zealand	68	68,159			
Norway	30	60,677			
Philippine Islands	162	140,917			
Russia in Europe					
Spain	90	113,247			
United Kingdom			422	1,240,055	
Uruguay	63	27,378			
Other Countries	761	756,686	191	300,518	
Totals	3,305	\$2,593,236	1,280	\$3,215,206	

NINE MONTHS ENDING SEPTEMBER, 1918

		Passenger Cars		Trucks	
	No.	Value	No.	Value	
	1,441	\$1,482,236	43	\$39,863	
	3,239	2,729,539			
	56	43,498			
	812	663,272	1,234	1,505,744	
	8,539	6,425,319			
	1,573	1,982,081			
	1,593	2,126,613	430	895,248	
	2	4,100			
	709	834,241			
	987	1,088,090	2,172	7,876,435	
	1,585	1,170,203			
	1,159	973,534			
	126	301,574			
	1,497	1,270,916			
	10	8,325	2	5,454	
	673	806,086			
	340	959,044	2,180	6,440,815	
	1,189	695,317			
	6,518	6,052,569	1,636	2,494,786	
	32,048	\$29,616,551	7,967	\$19,258,345	

at the convention. Mr. Todd will speak on November 15 on the implement industry. Following are the exhibitors:

B. F. Avery & Sons Co., Omaha, Avery tractors and implements.
Janesville Machine Co., Omaha, tractor plow and implements.
Western Motor Car Co., Omaha, Diamond-T and Columbia trucks.
Nebraska Moline Plow Co., Omaha, Universal tractors and equipment.
J. I. Case Plow Works, Omaha, J. I. C. tractors.
Nebraska Bull tractor Co., Omaha, Neb., Bull tractors.
Turner Manufacturing Co., Omaha, Turner Simplicity tractors.
Mid-West Truck & Tractor Co., Omaha, Turner tractors, Simplicity engines, Traffic, Wolverine and Oneida trucks.
Noyes-Killey Motor Co., Omaha, Wisconsin tractors.
J. I. Case Threshing Machine Co., Omaha, gas and oil tractors.
Hart Parr Co., Charles City, Ia., Hart Parr 15-30 kerosene tractors.
Jones-Opper Co., Omaha, Cleveland crawler tractors.
Hanson-Tyler Auto Co., Omaha, Allis Chalmers tractors.
International Harvester Co., Omaha, International tractors, implements.
Globe Manufacturing Co., Terry, Ia., hand engines, electric washers.
Sunderland Machinery & Supply Co., Omaha, feed grinders, tank heaters.
John Deere Plow Co., Omaha, implements and vehicles.
Parlin & Orendorff Plow Co., Omaha, tractor drawn implements.
Associated Mfg. Co., Omaha, engines and separators.
Henry & Robinson Hdw. Co., Omaha, implement supplies.
Stover Mfg. & Engine Co., Omaha, engines and graders.
R. H. Boomer Mfg. Co., Council Bluffs, Ia., implements.
Oliver Chilled Plow Works, Omaha, tractor tools.
Cushman Motor Works, Lincoln, Neb., motors and unit light plants.
John Day Rubber Co., Omaha, tank heaters and belting.
Hayes Pump & Planter Co., Omaha, pumps and implements.
Emerson-Brantingham Co., Omaha, implements.
Philip Barnard Co., Sioux City, Ia., tanks.
Avery Co., Omaha, Avery tractor plow.
New Idea Spreader Co., Omaha, implements.
Joel Turney Co., Fairfield, Ia., wagons and farm trucks.
Electric Wheel Co., Quincy, Ill., farm trucks and wagon boxes.
Advance Rumely Co., Lincoln, Neb., Huber tractor.
J. D. Tower & Sons Co., Mondota, Ill., corn cultivators.

Importation of Pig Tin

WASHINGTON, Nov. 2—Hereafter licenses for the importation of pig tin will be authorized by the War Trade Board where the applications, otherwise in order, cover shipments purchased prior to Oct. 1, 1918. The date of purchase of such shipments will be determined by the American Iron and Steel Institute. Licenses will be issued for importation of pig tin when the applications, otherwise in order, were to the United States Steel Products Co., regardless of the date of purchase. Licenses will not be issued for the importation of pig tin under any circumstances excepting those outlined above. Selling prices on the tin recently purchased by the Inter-Allied Tin Executive at London and allocated to the United States will be announced some time between now and Dec. 31, 1918. Consumers, jobbers and dealers requiring spot tin will be assisted in locating stocks if they will communicate with the Sub-Committee on Pig Tin, American Iron and Steel Institute, Room 1811, 71 Broadway, New York City.

September Exports from New York

Another Big Increase in Truck Figures—Parts Exports Also Satisfactory

NEW YORK, Nov. 4—A fully maintained gain in both the number and value of trucks exported from the port of New York is the principal feature of the figures for the month of September. August truck exports showed a gain of 95 per cent over July, and the increase in September is a fraction over 94 per cent as regards number and almost 70 per cent in value.

Passenger cars show a falling off of approximately 30 per cent in number and 28 per cent in value, as against the previous month's totals, but under existing manufacturing conditions this drop is not unexpected.

Parts Exports Increase 30 Per Cent

Exports of parts show an increase in value of over 30 per cent in comparison with the total of August exports, and as the August figures available at this time are not quite complete the actual improvement is undoubtedly appreciably greater.

Chile is our largest buyer of passenger cars, with 280 for the month, and England and France have taken between them 723 of the 862 trucks exported. These two countries also lead as pur-

chasers of automotive parts and Chile's share of the total is also big. Siam rejoins our list of customers after an absence of some time.

Government Needs Laborers

WASHINGTON, Nov. 4—More than 370,000 common laborers are required immediately for work in ordnance plants, Navy yards and docks and for cantonments and other army construction work, and this amount, it is said by the Department of Labor, will have to be taken from "non-essential" industries. The ordnance makers need 139,000 workers, the Construction Division 200,000, and the Bureau of Yards and Docks of the Navy Department 31,000.

Serious disorganization of labor supplying the machinery of the United States Employment Service is threatened, according to the Department of Labor, by the practice of some employers in asking for larger numbers of workers than they need or can use and the Department of Labor is requesting various employers to be more reasonable in their demands.

There is an instance of factories requisitioning 1500 unskilled men who upon arrival at the plant found no place to sleep and no place where they could be fed and as a result more than 50 per cent deserted as quickly as they could. Another instance is that of an employer asking for 100 skilled workers when less than 50 would have been sufficient. Many other examples are quoted by the Department of Labor.

AUTOMOBILE, TRUCK AND PARTS EXPORTS FROM NEW YORK FOR SEPTEMBER

	Cars		Trucks		Parts Value
	No.	Value	No.	Value	
Argentina	81	\$69,645	..	.....	\$82,748
Australia	40	38,756	1	\$2,132	.....
Barbadoes .....	..	.....	..	.....	2,204
Bolivia .....	..	.....	..	.....	1,373
Brazil	70	63,507	..	.....	30,901
British Guiana	5	5,172	..	.....	6,037
British India .....	..	.....	..	.....	379
British South Africa	50	40,927	..	.....	.....
British West Indies	7	4,369	..	.....	1,012
Chile	280	317,998	25	28,796	113,897
Colombia	4	2,966	..	.....	993
Costa Rica .....	..	.....	..	.....	163
Cuba	24	55,564	32	53,639	41,462
Danish West Indies	5	3,267	..	.....	952
Dutch East Indies .....	..	.....	..	.....	4,080
Dutch Guiana .....	..	.....	..	.....	424
Dutch West Indies	1	480	..	.....	166
Ecuador	2	1,600	..	.....	426
Egypt	5	20,000	..	.....	.....
England .....	..	.....	383	1,113,104	521,913
France	70	32,900	374	1,182,187	310,687
French East Indies .....	..	.....	..	.....	75
French West Indies	6	4,781	..	.....	5,868
Greece .....	..	.....	..	.....	7,433
Guatemala .....	..	.....	..	.....	329
Haiti	2	2,402	..	.....	1,621
Honduras	2	5,000	..	.....	24
Iceland .....	..	.....	..	.....	1,521
Italy .....	..	.....	10	21,817	8,122
Jamaica	6	6,534	..	.....	1,371
Japan	5	11,522	11	13,905	.....
Mexico	22	29,718	2	1,400	7,433
Newfoundland	3	3,515	..	.....	525
New Zealand	4	3,556	..	.....	.....
Nicaragua .....	..	.....	..	.....	179
Norway	30	60,667	6	5,250	4
Panama	2	1,100	..	.....	1,510
Peru	36	68,536	11	30,422	8,600
Philippine Islands	26	13,330	..	.....	.....
Salvador	5	4,293	..	.....	.....
Santo Domingo	22	24,755	..	.....	4,605
Siam .....	..	.....	1	2,917	.....
Spain	88	111,122	..	.....	1,832
Straits Settlements	1	850	6	9,261	22,621
Trinidad	2	3,049	..	.....	3,877
Uruguay	63	27,373	..	.....	3,746
Venezuela	6	10,183	..	.....	5,601
	975	\$1,049,587	862	\$2,465,100	\$1,206,704

Canadian Ford Is Prosperous

A Surplus of \$4,856,049 Is Shown for the Year—Fewer Cars Were Built

FORD CITY, ONT., Nov. 4—Although the Ford Motor Co. of Canada, Ltd., built only 46,914 cars during the fiscal year ended July 31 (3913 less than in 1917), the company's gross business totaled \$24,608,442. This is an increase of approximately \$800,000 over the total for the preceding year, and is due principally to an advance in price of passenger cars put in effect during the year.

The corporation's net profits for the year were \$2,358,192.94, an increase over last year of \$35,545. Its business profits tax for 1918 was \$167,951.

The balance sheet which is given here-with shows a surplus of \$4,856,049.03, or nearly \$2,500,000 more than last year. Total resources amounted to \$14,281,808.62, an increase of \$1,771,677 over the previous year. A 5 per cent cash dividend, distributed Oct. 14, 1917, and amounting to \$350,000, was the only disbursement to the stockholders during the fiscal year. There was no dividend payment the previous year. It was intimated another dividend might be declared in the near future.

Among the current assets, cash amounted to \$580,975.53, contrasting with \$2,066,456 last year. The reduction is largely accounted for by an increase in inventories, the aggregate of which, \$6,978,010.16, compares with \$3,859,214 a year ago, part of the increase in inventory also being attributable to the higher costs of materials. Of the total, the inventories for the home office totalled \$6,351,671.80, and is chiefly made up of manufactured parts of cars and trucks.

No change in capital stock was made during the year, the amount issued remaining at \$7,000,000 of the \$10,000,000 authorized.

The directors were re-elected as follows: Henry Ford, James Couzens, Gordon M. McGregor, Frank L. Klingensmith and W. R. Campbell.

Weather Forecasts For Motor Routes

WASHINGTON, Nov. 4—The Weather Bureau of the U. S. Department of Agriculture has arranged, in co-operation with the State Highway Commission of Pennsylvania, to aid motor truck traffic during the coming winter over the Lincoln Highway between Pittsburgh and Harrisburg by giving out daily information of the weather conditions prevailing over the route and issuing weather forecasts and warnings of heavy snows and cold waves for the region traversed.

The plan is for assistant superintendents of highways at points along the route to report to the Weather Bureau office at Pittsburgh at 8 a. m. by telephone or telegraph the depth of snow or ice on the highway, giving its general condition. These reports are published

in the newspapers and furnished to the different automobile clubs, thus becoming available to automobile and motor-truck drivers passing over the highway. The forecasts and warnings are given public distribution and telegraphed to the superintendent of highways at Harrisburg, who gives instructions to his forces along the highway to make provisions for the anticipated weather conditions. This service was in operation last winter and gave great satisfaction. The Weather Bureau is ready to give similar service to other traffic routes as may be desired.

Completing Military Highway Work

WASHINGTON, Nov. 4—Nine miles of concrete road between Alexandria, Va., and Camp Humphreys, Va., soon will be ready for use, marking the completion of planning and supervisory work done by engineers of the Bureau of Public Roads of the U. S. Department of Agriculture for the military authorities. The road from Alexandria to Camp Humphreys is the longest military highway outside of cantonments that has been planned and supervised by engineers of the bureau, although the total construction planned and supervised by these engineers aggregates several hundred miles and covers practically all the recognized types of construction, from sand clay to first-class surfaces and concrete roads. Seventeen highway engineers and one superintendent of construction were detailed to military work by the bureau in July, 1917, the period of their assignments varying from 3 to 15 months.

New Canadian Rule on Car Imports

Restrictions Modified to Permit Entry of Bodies and Parts Not Obtainable in Canada*

OTTAWA, ONT., Nov. 1—The War Trade Board announces a new ruling in regard to import licenses for automobile bodies and chassis. It will be remembered that by order-in-council of June 3 the importation of automobiles valued at \$1,200 and upward at place of manufacture was prohibited except under license by the board. A memorandum of the department issued Sept. 17 declared that this prohibition also applied to the body and chassis of automobiles when the body or chassis together with the usual parts required to complete the automobile, amounted in value to \$1,200 or upwards, f.o.b. at place of export.

Regarding these restrictions on the importation of automobiles bodies and chassis, the War Trade Board has decided that where an automobile is for use on a chassis imported into Canada prior to June 16, 1918, upon proper evidence being submitted of the facts license for importation will be recommended. Furthermore the board will be disposed to recommend import license for bodies or other parts of cars not obtainable in Canada which are an essential requirement for the production of automobiles by bona fide manufacturers of automobiles in Canada.

Balance Sheet of the Ford Motor Co. of Canada

<i>Assets</i>		
Cash on hand in bank.....		\$580,975.53
Accounts receivable—		
Sight drafts and foreign shipments.....	\$666,094.71	
Open accounts (less bad and doubtful debts).....	160,255.34	
Customs drawback	190,313.02	
		1,016,663.07
Deferred charges—		
Insurance, taxes, etc.....		173,421.29
Stores accounts—		
Home office	\$6,351,671.80	
Branches (less profit unearned).....	626,338.36	
		6,978,010.16
Plant accounts (less depreciation)—		
Home office	\$4,335,981.37	
Branches	1,196,756.20	
		5,532,737.57
Patents		1.00
		\$14,281,808.62
<i>Liabilities</i>		
Purchase creditors, etc.....	\$1,157,500.78	
Accrued pay roll and miscellaneous expenses.....	115,481.39	
Contract rebates	646,301.96	
		\$1,919,284.13
Reserves—		
Foreign shipping space.....	\$160,235.95	
Uninsured risks	100,000.00	
Business profits taxes	764,190.51	
		1,024,426.46
Surplus—		
Balance July 31, 1917.....	\$2,445,139.53	
Adjustment 1917 tax reserve.....	52,716.66	
Profits for year.....	2,358,192.84	
		\$4,856,049.03
Five per cent dividend paid Oct. 15, 1917.....	\$350,000.00	
Business profits tax, 1918.....	167,951.00	
		517,951.00
		4,338,098.03
Capital stock issued		7,000,000.00
		\$14,281,808.62

Moon Director in Charge of Motor Transport Repair Yard

ST. LOUIS, Nov. 4—Earl J. Moon, a director and one of the founders of the Moon Motor Co. of this city, has been ordered from Fort Sam Houston, Tex., to France, where he will be placed in charge of one of the repair yards of the Motor Transport Corps. Moon was commissioned a lieutenant in the Motor Transport Corps Oct. 18.

A. W. Crossman has been appointed district representative of The Cleveland Tractor Co., with headquarters at 604 Brockman Building, Los Angeles. His territory comprises California, Washington, Oregon, Arizona, Utah, Nevada and Idaho.

Charles Brownell, advertising manager of the Ford Motor Co., was elected vice-president of the Better Business Bureau of Detroit at a meeting of the executive committee. Plans were made for increasing the scope of the work.

E. H. Geyer, for a number of years associated with the Byrne-Kingston Co. and the Kokomo Electric Co., both of Kokomo, Ind., has been appointed general sales manager of the Hercules Motor & Mfg. Co., Canton, Ohio.

J. Edward Demar has resigned as sales manager of Chas. E. Reiss & Co., Inc., New York, to accept the presidency of the Carlisle Sales Co., Inc., distributor of the Carlisle cord tire, with offices and showrooms at 237 West Fifty-eighth Street.

Packard Builds 900 Liberties in October

DETROIT, Nov. 4—During October the Packard Motor Car Co. completed 900 Liberty engines, or thirty-three in every working day. The company exceeded by 10 per cent the quota of 825 set for it by the Aircraft Production Board. The daily production during the month fluctuated, governed largely by the supplies of raw materials. On two days, the high score of fifty was made, and three days, forty. Most of the time, however, the engine assemblies stood at approximately thirty-five per day.

Texas Has 271,854 Vehicles

AUSTIN, Nov. 6—It is shown by the records of the State Highway Commission that there are 271,854 automobiles and motor trucks registered in Texas. It is estimated, however, that this registration is perhaps twenty thousand in excess of the total number of motor vehicles now in actual use in this State, that number having been probably junked since their registrations. It is estimated that there are about 250,000 automobiles and motor trucks now in use in Texas. No separate record is kept of automobiles and motor trucks. It is therefore not definitely known how many there are of each of these motor vehicles.

Men of the Industry

*Changes in Personnel and
Position*

Harry W. Ford, former president of the Saxon Motor Car Corp., Detroit, is reported to have been given a commission with the Motor Transport Corps, to be located at Jacksonville, Fla., where he is at present.

E. M. Benedict, formerly of Toronto, and expert in shell manufacture, has been appointed general manager of the Jackson Munitions Corp., Jackson, Mich.

J. H. Gould, formerly of the J. H. Gould Co., Detroit, has been appointed chief engineer of the Buffalo Pressed Steel Co., Buffalo, N. Y.

Tracy Influenza Victim

WASHINGTON, Oct. 30—Percy Tracy died here to-day a victim of influenza followed by pneumonia. Mr. Tracy, recently buyer of parts for the Army trucks under Christian Girl, who called him to Washington, had just lately accepted the position of trailer purchaser under Col. F. Glover in the Quartermaster Department. Prior to the war he was the buyer for 5 years for the Paige Detroit Motor Corp., and at one time acted in the same capacity for the Premier Motor Co.

New Turner Tractor Distributor

PORT WASHINGTON, Wis., Nov. 6—The Turner Mfg. Co. has appointed the Owen Magneto Corp, Chicago, distributors for Northern Illinois and Northern Indiana and the western half of Michigan for the Simplicity Tractor.

Navy Seaplane Aloft 9 Hours

WASHINGTON, Nov. 4—A navy seaplane equipped with a Liberty engine recently remained in the air for 9 hours, says a report received today from Admiral Sims. The seaplane carried a full military load, four men, regulation supply of gasoline, two bombs weighing nearly 500 lbs. and two machine guns. No additional gasoline tanks were carried.

Sulphuric Acid Contract Plant

WASHINGTON, Nov. 5—A sulphuric acid contract plant will be located at Grand Rapids, Mich. The Construction Division of the Army has been ordered to erect and equip this plant at an estimated cost of \$1,500,000. The plant is to be situated upon a tract of land which is the property of the U. S. Government upon which a picric acid plant is now being erected. When in operation this plant will be of sufficient size to produce approximately 75,000 net tons per year.

Capt. Gilson Promoted Major

RACINE, Nov. 4—Capt. James W. Gilson of Racine, Wis., formerly sales manager of the Mitchell-Lewis Motor Co., now the Mitchell Motors Co., and the Lewis Motor Car Co., Racine, has been promoted to major, according to word received from France. In 1916 he organized a battery of field artillery in Racine to go to the Mexican border, and a year later he formed a second unit in which he was placed in command as captain. Before his battery left Camp MacArthur, Tex., Capt. Gilson was assigned to the staff of Brig. Gen. Haan and went overseas with the now famous Thirty-second division. In France he was re-assigned to the staff of Brig. Gen. Irwin, 57th Field Artillery brigade, upon which he now is serving as a major. His command has been in the thick of the fighting north and northeast of Chateau-Thierry for more than 100 days.

O. G. Watson, secretary, Menominee Motor Truck Co., Menominee, Mich., has accepted a commission as a second lieutenant in the Motor Transport Corps and left Oct. 29 for Camp Holabird, Md., to enter active service. He has resigned as alderman of the First ward, Menominee.

Clifford F. Messinger, advertising manager, Chain Belt Co., Milwaukee, has been given indefinite leave of absence to accept a commission as a first lieutenant in the gas and flame division, Chemical Warfare Service, U. S. Army. He has departed for Camp Kendrick, Lakehurst, N. J.

T. J. Phillips, cost and production expert of the Kissel Motor Car Co., Hartford, Wis., during the last 2 years, has resigned to accept the position of controller of the Porto Rico Sugar Co.

Crippled Men Need Cycles

WASHINGTON, Nov. 4—American manufacturers will be called upon to furnish scores of thousands of tricycles and motorcycles for men who have lost limbs in the war, Consul H. D. Van Sant, who is located at Dunfermline, Scotland, said recently in a report to the Department of Commerce. The consul said bicycles were becoming so scarce in Great Britain that wheels originally selling at \$25 or \$30 now bring from \$60 to \$70.

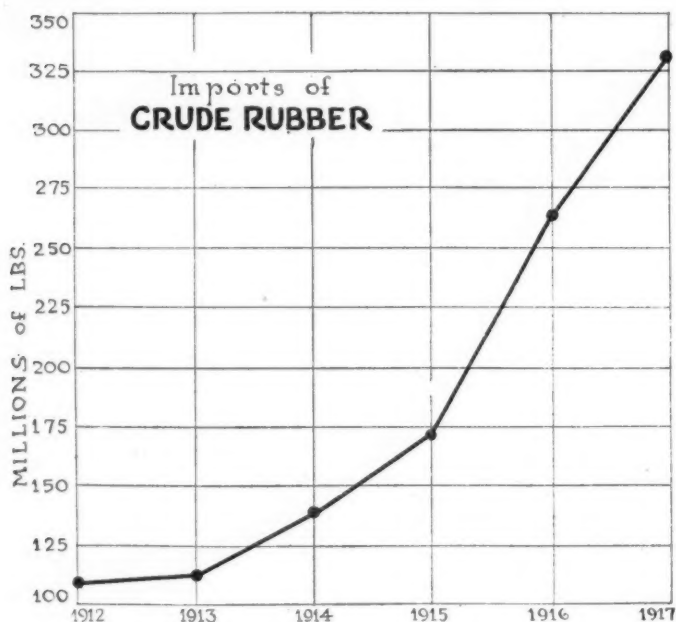
If the demand for bicycles and tricycles is to be met American manufacturers must get busy, Mr. Van Sant intimated. A little readjustment of munition making machinery would enable the manufacturers to devote their plants to the new needs, the consul said.

Mr. Van Sant estimates that veterans of the war in Great Britain alone will be able to use about a million wheels of all kinds. To supply the demand will require the employment of an army of men and women and will reabsorb into the industrial ranks many of the returning soldiers.

AUTOMOTIVE MATERIALS MARKETS

Materials Market Prices

Acids:			
Muriatic, lb.....	.02	-.03	
Phosphoric (85%)..	.35	-.39	
Sulphuric (60), lb..	.008		
Aluminum:			
Ingot, lb.....	.33		
Sheets (18 gage or more), lb.....	.40		
Antimony, lb.....	.13	-.13 1/4	
Burlap:			
8 oz., yd.....	12.4	-15.85	
10 1/2 oz., yd.....	14.6	-18.6	
Copper:			
Elec., lb.....	.26		
Lake, lb.....	.26		
Fabric, Tire (17 1/4 oz.):			
Sea Is., combed, lb.	1.65	-1.70	
Egypt, combed, lb.	1.25	-1.35	



The increase in the quantity of crude rubber imported in recent years marks the development of the cultivated varieties

Egypt, carded, lb..	1.20	-1.30
Peelers, combed, lb.	1.05	-1.20
Peelers, carded, lb.	.95	-1.05
Fibre, (3/4 in. sheet base), lb.....	.50	
Graphite:		
Ceylon, lb.....	.07 1/2	-.25
Madagascar, lb....	.10	-.15
Mexican, lb.....	.03 1/4	
Lead, lb.....	.08	-.09
Leather:		
Hides, lb.....	.18	-.35 1/4
Nickel, lb.....	.40	
Oil:		
Gasoline:		
Auto., gal.....	.24 1/2	
68 to 70 gal.....	.30 1/2	
Lard:		
Prime City, gal..	2.50	
Ex. No. 1, gal....	1.70	
Linseed, gal.....	1.61	-1.62
Menhaden (Brown), gal.....	1.30	-1.31
Petroleum (crude),		
Kansas, bbl.....	2.25	
Pennsylvania, bbl.	4.00	
Rubber:		
Ceylon:		
First latex pale crepe, lb.....	.61	
Brown, crepe, thin, clear, lb.....	.54	
Smoked, ribbed sheets, lb.....	.59	
Para:		
Up River, fine, lb..	.66	
Up River, coarse, lb.....	.36 1/2	
Island, fine, lb....	.55	
Shellac (orange), lb.	.74	-.75
Spelter.....	.09	-.09 1/4
Steel:		
Angle beams and channels, lb.....	.03	
Automobile sheet (see sp. table), Cold rolled, lb.....	.06 1/4	
Hot rolled, lb.....	.03 1/2	
Tin.....	.76 1/2	-.77 1/2
Tungsten, lb.....	2.45-2.50	
Waste (cotton), lb..	.12 1/4	-.17

AUTOMOBILE SHEET PRICES

(Based on No. 22 Gage. Other gages at usual differentials)

	Primes only Per 100 lbs.	Primes when seconds up to 15 per cent are taken Per 100 lbs.
Automobile body stock.....	\$5.95	\$5.85
Automobile body stock, deep stamping.....	6.20	6.10
Automobile body stock, extra deep stamping.....	6.45	6.35
Hood, flat fender, door and apron, or splash guard stock.....	6.05	5.95
Crown fender, cowl and radiator casing, deep stamping.....	6.30	6.20
Crown fender, cowl and radiator casing, extra deep stamping.....	6.55	6.45
Automobile Sheet Extras for Extreme Widths:		
Nos. 17 and 18 over 36 in. to 44 in., 10c. per 100 lb.		
Nos. 19 and 21 over 36 in. to 44 in., 30c. per 100 lb.		
Nos. 22 to 24 over 26 in. to 40 in., 40c. per 100 lb.		
Nos. 22 to 24 over 40 in. to 44 in., 80c. per 100 lb.		
Black Sheet Extras to Apply to Narrow Widths:		
Oiling, 10c. per 100 lb.		
Patent leveling, 25c. per 100 lb.		
Resquaring, 5 per cent of gage price after quality, finish and size extras have been added.		
Seconds 10 per cent less than the invoice Pittsburgh price for corresponding primes.		

Can Meet Transportation Emergency

WASHINGTON, Nov. 4—Pennsylvania can meet any motor transportation emergency that may arise within that State, according to a report filed to-day by the State Council of National Defense with the Council of National Defense.

When the Highways Transport Committee of the Council of National Defense recently undertook to organize subordinate committees in each State for a more thorough utilization of the nation's highway transport resources it obtained the most efficient, immediate co-operation in Pennsylvania.

It was unnecessary to create new machinery because the Pennsylvania Council of National Defense, in its Motors and Motor Trucks Department, already possessed a state-wide organization, which in large measure was carrying out the policies advocated by the highways transport committee.

The report presents a summary of Pennsylvania's motor activity. One of the first steps taken by David S. Ludlum, formerly State motors director and now chairman of the Pennsylvania Highways Transport Committee, was a service

registry of 25 per cent of the 300,000 passenger cars of the State, 10 per cent of the registered cars being held available for emergency at all times.

This service has been rendered in all counties for Liberty Loan drives, also in transportation of farm and munition workers and in some instances in moving military bodies. Particularly valuable service was given in transporting nurses, doctors, medical stores and in conveying stricken persons during the influenza epidemic. Trucks equipped as ambulances saved the day in many devastated districts.

Calendar

ENGINEERING

Nov. 14-15—New York. Society of Naval Architects and Marine Engineers. Twenty-sixth general meeting. Engineering Societies Bldg., 29 West 39th Street.

SHOWS

Nov. 11-16—Phoenix, Ariz. Tractor demonstration, State Fair.
Nov. 11-16—Pittsburgh, Pa. Fall Automobile Show, Motor Square Garden. Automobile Association of Pittsburgh.
Jan. 12-19—Des Moines, Ia. First Tractor Show, Des Moines Thresher & Tractor Club. H. J. Clark, Mgr.

Limit Garage Construction

WASHINGTON, Nov. 4—Garages, gasoline stations, store buildings and 14 other types of structures were listed yesterday by the War Industries Board as types of non-war construction which can be best postponed until after the war. The list issued includes: Churches, schools, hotels, office buildings, bank buildings, public buildings, moving picture houses, theaters and other amusement places, apartment buildings, water-work improvements, sewerage systems, garages and gasoline stations, sidewalks and park improvements.

More Cleveland Additions

CLEVELAND, Nov. 4—Although the number of permits issued at the city building department the past week was not long, it contained a few permits for new construction work of considerable size. The Willard Storage Battery Co. took out a permit for a \$50,000 warehouse at 280 East 131st Street. The Lang Body Co. was granted a permit for a \$25,000 one-story factory addition, 16 by 80, at 3100 West 106th Street.